The TROPICAL AGRICULTURIST MONTHLY.

XXII. COLOMBO, SEPTEMBER 1st, 1902. No. 3.

PLANTING IN TRINIDAD.

(*Extracts from Annual Report of the Superintendent Royal Botanic Gardens for the year* 1901-2.)

BEE KEEPING.

BY desire of His Excellency the Governor the Superintendent undertook to form an Apiary on the Station, and with a view of securing for the Colony a good class of Bee, tested Italian Queens were introduced from Jamaica ; the majority of which were distributed amongst local bee keepers, sufficient only being retained at St. Clair for the formation of breeding Colonies. These have done well, and there are now several good strong Colonies of the introduced kinds, from which it is hoped shortly to raise sufficient Queens for local distribution. The common or black bee was used as a *nucleus* for the young Colonies raised with the imported Queens. When strong enough the latter were removed to suitable protection at the old Garden to prevent hybridization. Some excellent "sections" of honey have been obtained during the flowering season of the logwood, and the honey pronounced of fine quality, but the supply of honey is far from being abundant as the bees do not bring in large quantities. The young men in training at the Station assist the Superintendent in the management, and take great interest in the work. A short report on bee keeping was prepared by the Superintendent at the request of the Agricultural Society.

ECONOMIC PLANTS (RUBBER).

Castillo elastica, planted in 1898, is now over 25 feet in height, and some of the trees have stems 5 inches in diameter. It has been found on test that Rubber fluids or *latex* from these young trees produce rubber, inferior in quality to older trees. Some few years ago, I published an informal account of an analysis of a year old tree, made by a gentleman who had undertaken the study of the *latex* of Castilloa, and he reported finding 8 per cent. of rubber; but it is now evident that although rubber material may have been found, it was of inferior quality, and only the larger trees eight or ten years old, can be depended upon to furnish rubber of good quality. It was anticipated that rubber material could have been extracted from one year old trees, but this has proved illusory, for although chemically, the rubber is there, yet it is not in such a condition as to make it of market value and up to the present no chemical process has been devised which will change the soft and sticky material obtained from young trees into the hard and elastic produce afforded by mature trees.

Plantations of this rubber in Trinidad and Tobago are now yielding large quantities of seed annually, and consequently the demand at the Experiment Station, has largely decreased. Good seed can be obtained according to season from March to June of each year. The seed has, however, a very fugitive vitality, and even with the best packing, it is very difficult to send it long distances in good order.

PARA RUBBER.—*Hevea brasiliensis.*—Our plants, put out in 1898, at the same time as the Castilloa trees, fully equal the latter in height, but have not so large a stem circumference. They are, however, doing well, and will certainly thrive in our climate. Our crop of seed from original trees was very small during the official year 1901-2. From recent literature it is gathered that this tree thrives in South America in interior districts, and not only on flooded river sides as has been formerly understood. The occurrence of these trees in the deltas of large rivers is said to be due to the wash of the seeds from higher grounds. If this is actual fact (and the authority appears reliable) it will give considerable encouragement for inland planting. Confirmation of this report is afforded by Dr. Bovallius who brought down seed of trees found on the upper reaches of the Orinoco, plants of which are now at St. Clair and growing freely. It may be stated however that the seed, as received, was much smaller than that grown at lower altitudes and therefore it is possible, that the high land *Hevea* may prove to be a new variety.

WEST AFRICAN, "IRE," OR LAGOS, "SILK RUBBER."—"Funtumia elastica." Staph. These trees have made splendid growth during the year. Some are

now over 20 feet in height with a stem diameter of four inches though not yet four years old. Considerable variation has been noticed in the form of the seed vessels among the trees of our plantation, but it may be, that is only normal seed variation, but at the same time there appears some reason to suspect that two or more species may be found to be present. One of the forms, has its follicles long, narrow, and pointed; while the commoner form has follicles stout and thickened at the apex. The quality of the Rubber afforded by each kind has not been, as yet, well tested; but it appears on superficial examination to be of equal value. Latter tests will decide this. The trees have given a fine crop of seed during the past season, and a large quantity of plants have been raised. From present appearances it is a tree that will stand, probably, more hardship than any of the other Rubbers, as it can bear exposure to the sun although it does not grow fast in such situations. In my paper on Rubber Planting published in the West Indian Bulletin (Dulau & Co., London, this rubber is more fully discussed. A section of this rubber has been planted at three feet apart and in the full sun, in order to test its growth under the conditions of close planting and growth without shade.

CEARA RUBBER—"Manihot Glaziovii." Our soil at the experiment Station appears quite unsuitable for the growth of this tree, as it makes little progress. In some districts of the Colony however, it is reported to be growing well.

LANDOLPHIA SPECIES—Landolphias give exeellent rubber fluids which easily coagulate. At the experiment Station several species are growing well, planted against trees of 'Pithecolobium Saman.' Several kinds are under cultivation, but it will be some time yet before any quantitative returns can be given, as is the case with many tropical products.

FIBRE PLANTS.—A stock of Fibre plants have been kept on hand. This includes "Agave rigida var, sisalana,' the "Sisal Hemp" which grows quickly and well. This plant is established in Several Stations in Trinidad and Tobago, but as yet, there is no output of Fibre. Several species of Sansevieria are also in cultivation. This affords the Bowstring hemp of Commerce "S. Longiflora is well acclimatized, and is now in some demand for planting. "Musa textillis or "Manilla Hemp", is grown in small quantity only.

CITRONELLA GRASS.—"Andropogon Nardus." This is seen to differ much from the common "Lemon grass" "(Andropogon Schoenanthus)" usually found in the West Indies and its oil is also found to differ considerably from that obtained from the latter grass. Specimens of each were manufactured in illustration of the paper read by the Superintendent at the Annual Conference, Barbados, previously mentioned. The grass grows readily here, and flowers freely while the Common "Lemon grass," seldom produces flowers.

CAMPHOR.—*Cinnamomum Camphora, Nees.*—The interest arising in Camphor production, owing to certain monopolies in Formosa, has caused enquiry to be made, as to the possibility of growing Camphor on a commercial scale, in other places. In Trinidad it grows rapidly but never makes a large tree. The wood contains a fair amount of camphor, and some camphor oil, specimens of which were lately manufactured at St. Clair, an account of which was included in a paper read at the Annual Agricultural Conference held in Barbados, January, 1902. The Camphor was of good quality, and the Camphor oil was excellent, more of the latter being produced from the young wood than from the older stems. The sample made, is probably the first on record of West Indian manufacture. It is intended to grow a plot, with a view of testing the feasibility of growing it on a commercial scale for camphor and for oil. Trees planted three years ago are now ten feet in height. It propagates readily by layers.*

* *A recent account of Ceylon experiments appears to show reasonable hope of establishing a remunerative Industry in Camphor.*

MULBERRY.—*Morus rubra.*—This tree grows into bushes of several feet in diameter and ten or twelve feet in height. It may be of future importance, were silkworm culture taken up in this island.

LONG PEPPER.—*Piper longum.*—This pepper grows well and rapidly covers the ground, coming into bearing very quickly.

BLACK PEPPER.—*Piper nigrum.*—The section devoted to this plant has made fair progress, but the plants have not as yet reached their fruiting stage. The small plantation at the old gardens have however given annual crops, and the fresh seed has been in demand by European seedmen for raising plants intended for West and Central African plantation. It is not readily obtainable elsewhere than in Trinidad where it was first fruited, on this side of the world.

VANILLA.—*Vanilla planifolia.*—The Vanilla is planted to cover trees of *Erythrina Corallodendron* a dwarf growing Immortel. It has made fair progress, but has not yet reached its flowering stage.

PIMENTO.—*Pimento officinalis.*—The plants of this spice tree, are over ten feet high, at three years old, and are evidently true. The seed was procured from Jamaica. The popular idea that seed will not grow unless first eaten by birds has therefore been disproved. It is curious to note that while Pimento acris (the West Indian "Bay Tree") is common on the Island, the true Pimento appears to have been unknown here until the recent importation. The plants are doing well, and are very healthy and vigorous and may be expected to fruit in a year or two.

IMMORTEL.—*Erythrina Sp.*—A small and irregular section on the boundary of the Station has been devoted to the growth of the two species of *Immortel* which are used almost exclusively for shading Cacao estates. One is known as the, Anauca suitable for highlands, and the other as the *Bocare*, suitable for low lands; Botanically known as *Erythrina umbrosa* and *Erythrina velutina.* Discussion has been current on the nitrogenous value of the flowers of this tree during the year, and the manurial value of the flowers has been placed by the Government Analyst of Trinidad at the very high figure of 6%.* This has however not yet been confirmed by independent analysis. As shade trees there can be no possible doubt of the value of the *Immortel* for Cacao estates, and no apology is needed for their use, but the fact remains, that good cacao is grown under other shade; and moreover we constantly receive enquiries for substitutes that will give a remunerative return, as the wood of the *Immortel* tree is useless even for fuel. The *Saman* or *Zaman*, a Central and South American tree, is coming gradually into use on some estates, as it is not so liable to fall and damage the cacao. The Nicaraguan tree—*Gliricidia maculata* has been planted at the station, and grown after a certain plan, it forms an efficient shade for cacao, as may be seen from the results obtained by its use. *E. Corallodendron* is in use as shade for Piper nigrum, and Vanilla, as mentioned in another paragraph. In a recent letter, a prominent planter regrets his inability to manure Cacao, shaded with Immortel; owing to the shade tree abstracting the value of the manure before the cacao tree has time to benefit by its application.

CLOVE.—*Caryophyllus aromaticus* L.—one tenth of an acre is devoted to the growth of Cloves. The same difficulty found with the Mangosteen, is experienced with the Clove. They grow well when established, but are very difficult to rear through their juvenile stages. Our section has several plants growing fairly well, but it needs many supplies.

CINNAMON.—*Cinnamomum Zelanicum Breyn.*—The Cinnamon plot is now well established and the trees are growing freely.

TOBACCO.—*Nicotiana Tabacum*, L.—Several varieties have been grown, but as the crop is now undergoing fermentation, it is too early to report on its quality. The leaves of some varieties are of good

*Since reduced to 4·03 per cent.

size and texture, and if it cures well will serve for good Cigar Tobacco. The crop of 1901 season, which finished curing in the early part of the year was a small one. It was of the Virginia variety, which appears to stand our climate better than the finer leaved kinds, the leaves of the latter becoming spotted by the weather.

TUMERIC.—*Curcuma longa*—A plot of this yielded at the rate of over two tons per acre, of the green tubers.

BHABUR GRASS.—*Ischmœum angustifolium*—The crop of plant harvested, showed produce at the rate of 6,000 lb. per acre of the dried grass.

GINGER.—*Zingiber officinalis.*—A plot devoted to this product yielded at the rate of ten tons per acre, of the undried rhizomes are of excellent size. There can be little doubt, as Mr. Meaden proved long ago at the Convict Depot at Chaguanas; that Ginger can be very successfully cultivated in Trinidad. It must however be harvested and cured in the dry season.

COLA.—*Sterculia acuminata.*—this plant grows fairly well at the station but as it takes some years to come into bearing, no results have yet been obtained.

FRUIT TREES.

MANGOES.—*Mangifora indica.*—I reported last year that a consignment of Mango trees had been received from the East Indies. Subsequently, an additional consignment was received. which arrived in good order. Those plants which were healthy on arrival made good progress, and fourteen trees are now planted out to the North of the office in permanent positions, and making vigorous growth. Eleven more are now ready for the open ground. These consignments, coming as they have from several different provinces, are expected to give us varieties differing from our West Indian seedling kinds. The sale of the varieties of named Mangoes has been large, and a decided choice has been made of the grafted varieties in preference to seedlings, which cannot be depended upon. Some of our best young trees three years planted gave a few fruit last season, which showed them true to name. It is to be hoped that the Mango trees will prove more prolific in the St. Clair soil than at the old garden where many trees exist which have not fruited for years. The trees are old and the soil worn out, as might be expected, cultivated as they are on land which has been planted since 1824 or 78 years. A large nnmber of stocks were grafted during the year, and plants may be obtained of most of the best named varieties formerly described in *Bulletin* reports. The section devoted to the growth of seedling varieties, raised from the best imported kinds, has made good progress; and it is hoped will give frnit one year hence.

ORANGES.—The imported kinds of Orange secured some few years since from Florida and planted at Experiment Station in 1898, gave a good crop for their size, during 1901; enabled their quality to be correctly estimated. Many of the trees have borne Oranges of excellent quality, suitable for market in any part of the world. Those known as "Pine Apple" Rubby and St. Michael's being especially good. An Orange of the Tangerine type, and evidently a variety of *Citrus nobilis* has a beautiful coloured Interior and is of excellent flavour, but appears to be less vigorous than others. The variety of Tangerine imported at the same time, is far from being equal to the Trinidad kinds. Our latest Orange to ripen is a variety called "Mandarin," a small fruit with a deep coloured rind. When imature, this is very acid, bnt if allowed to hang npon the trees, it becomes a most delicions morsel. As mentioned in previons reports the words "Mandarin" and "Tangerine" are applied to a numerous variety of seedling frnits, and similar fruits are named differently in the varions districts, A seedling Orange produced from a Grenada variety of *Citrus Nobilis*, gives very large frnit with a thick spongy skin, but the interior parts are simply "bags of juice" sweet, with a slight, though not unpleasant taste of the bittter flavour of the ordinary Shaddock, which the fruit is actually resembles in form. Several of the named kinds have been successfully budded on sour Orange stocks, and are now strong plants, for which we have more applications than we can at present supply; but measures are been taken to meet the demand, Many of our growers appears to doubt the feasibility of sending Oranges to distance markets from Trinidad. Oranges have however been successfully sent to England in ordinary packages by Royal Mail Steamer for several years in succession, and there can be no doubt that properly prepared and packed they can be safely transported in good order.

The following rules in packing should be complied with to ensure this result:—

1. Pick on a dry day, without bruising, "stem cutting" the Orange from tho tree, not pulling or shaking down the fruit. Any Orange which falls, should be rejected, as it will assuredly spoil others.

2. Dry for two or three days by spreading carefully in a singlo layer on a boarded floor, where there is plenty of air—until the skin becomes slightly leathery.

3. Wrap each Orange singly, and pack in boxes containing not more than a single cubic foot in each division, snd pack tightly so that they do not bruise each other in transit. The boxes should be made with air spaces between the slats. It is important to remember that "*Oranges are as tender as eggs*" and should be handled as carefully,

SHADDOCK - *Citrus decumana L*—Some years since the Department obtained grafts of the pink fruited Shaddock. These were grafted on seedling stocks and two plants were obtained. These have fruited the first time during the past season. Mr. McGillvray of Tobago, was good enough to present these, and sent us at the same time a fruit which was certainly the finest of its kind in size and flavour which has been seen here. We have been successful in getting some budded plants from these trees during the year which are now on sale in the nurseries in limited quantity.

CITRON.—*Citrus medica.*—A few years ago seed was presented to the Department, of the "Cedrat" or true Citron of Commerce. These were sown and the plants have fruited. Only one however is true to the original. It is intended shortly to take buds from this plant, so as to obtain the best fruit possible, as it is seen that seedling varities are unreliable.

BERGAMOT ORANGE.—*Citrus Bergamia, Risso.*—Seed was obtained of this Orange several years ago from Southern Europe, and plants were raised sufficient to plant one-tenth of an acre. These appear to vary largsly, and it is probable that but few will be found to produce fruit of the required character. To obviate this, a small consignment of rafted Bergamot plants was imported, which it is hoped will afford the true *perfume producing* fruits. These will be propagated by budding and grafting as soon as the quality of fruit is determined.

LIMES.—A section of our best seedling Limes was planted in 1898, and the trees are now coming into bearing, selected varieties will be propagated by budding for distribution as stocks are available.

THE TRINIDINE LIME.—*Citrus medica. var. acida.*—This is a variety of the lime, as large as an ordinary Sicily lemon, of like flavour, but slightly different from the ordinary Lime, and containing over twice the quantity of juice. This variety is one which appears to have originated at the old Gardens, where it was found established some fifteen years since. I am of opinion that this would become an extremely popular fruit in English and American markets once well known. A tenth of an acre has been established but here again was found the impracticability of reproducing Citrus fruits true from seed. Variation is considerable, and a selection of the best must be made, before propagation by budding is attempted.

LEMONS,—*Citrus medica, var. Limonum.*—A section devoted to SicilyLemons has shown but slow growth and considerable variety, and the practice of budding and grafting, must be again applied to ensure the production of good marketable fruit. In the operations of budding and grafting, the seville or Sour Orange stock has been exclusively used; as this is said to resist the attack the fungus commonly known as the "*Mal-de-Gomma*" or "*Root rot,*" from which many trees of the Genus suffer very considerably notably the seedling "Tangerine," of which over 25% have succumbed during the present dry season notwithstanding treatment with copper solution. Some plants were imported budded on stocks of *Citrus trifoliata*, a stock hardy in a cool climate. This stock itself is tender here, and the growth of the plants show that it is unsuitable for our work,

MANGOSTEEN – *Garcinia mangostana, Linn.*—In some places this fruit is confused with the Mango; a variety of the latter fruit without fertile seeds being actually known as the Mangosteen. *Spondias dulcis* the "*Pomme d'or*" or Golden Apple, is also known as Mangosteen, in some of the West Indies. The true Mangosteen however belongs to the order *Guttiferæ*, while the mango belongs to *Anacardiaceæ.* The Mangosteen is given in Index Kewensis as a native of Indian and Malay States. It was introduced to Trinidad many years ago, and there is now a large tree which bears annual crops of fruit, more or less, in accordance with the seasons; sometimes several hundreds, other years only a few dozens. The fruit has been estimated to be quite equal in size and flavour to produce found in the markets of the East, by those who have been resident in both countries.

COFFEE.

HYBRIDS.—The distinct varieties, described in my last report as having been raised from home grown seed of *Coffea stenophylla*, having fruited this year. The berries differ much in size from the type, but are of the same purple colour. The beans when cleaned are about the same size as ordinary *C. Arabica* while the type is much smaller than the variety. The berries are fairly large, with a thin skin, but the interior parts have some characters in common with Liberian, but intermediate between that species and *C. Arabica.* The beans are dark in colour but their inner or "silver skin" distinctly resembles that of Liberian though considerably modified. Roasted and tested for flavour, it was found to be indistinguishable from good Arabian. The varieties raised, vary somewhat in size of bean, and in the prominence of the Liberian character. There can now be little doubt that these Coffee plants are natural Hybrids between *Coffea stenophylla* and *C. Liberica*, as previously anticipated, but there is no direct proof that they are really so. Some of the varieties are more fruitful than others and it is intended to give the best varieties local names, and propagate them by grafting. One has been named "Commissioner" Coffee, and several successful grafts have been taken from this kind. The stock used being the strong growing Liberian. This strain is of course unknown upon the London market as the trees are special individuals, selected from seedlings, having characters differing from any known kind. They are in fact, NEW COFFEES, which it appear highly desirable to grow on for experiment. The value of the coffee from a grower's point of view is that it grows faster and better and fruit earlier than any variety of Coffea Arabica and does not require so much shade, while it is not so tall growing as the liberian, that is to say, the varieties appear to promise a hardy and easily cultivated strain of considerable value.

"CREOLE COFFEE" *Coffea Arabica varieties.*

1. Mocha.
2. "Hybrid" Mocha.
3. Maragogipe.
4. Minerva, or narrow leaved.
5. Ordinary "*Arabica*" or *Creole.*

These plants have grown well where sufficient shade has been available but in some sections where there was not sufficient shade at certain times of the day the growth has been much retarded.

As the experiment stands at St. Clair, it is readily seen that whenever the sun obtains access at the hours mentioned, the growth is feeble, weak and wanting in vitality, and proves that coffee requires a certain amount of shade at this elevation. The more robust Hybrids and Liberian can stand much more sun than the Arabian varieties. The most fruitful of our Arabian varieties are the 'Hybrid Mocha' and 'Minerva' coffees. The 'Marsg gipe' is a large beaned coffee, but is wanting in colour in ordinary seasons. The type trees of *Coffea stenophylla* produced good crops, and the trees are healthy, and appear well adapted for cultivation.

COFFEA ROUSTBA, *Linden.*—This is a new species of coffee from The Congo. It has flowered and fruited during the year. It produced large clusters of pure white flowers having an exquisite perfume, and bears small globular red berries. The crop produced has all been used for seed. The tree has somewhat the habit and size of leaf of Liberian coffee, but is quite distinct from that variety. It is reported that the flavour of this coffee is superior to many other species This trees have again flowered, and a larger crop is anticipated during the coming season,

CACAO.—*Theobroma Cacao* and other species.—The section devoted to Cacao has done remarkably well, and several Cacao planters have expressed a high opinion on the method of cultivation pursued. Plants of pure Criollo are now bearing for the first time, and are giving excellent fruit. Distinguishing characters of this variety are, the white interior of the seeds, and the bottle shaped neck of the fruit. It has been found that 'outside colour,' red or yellow, has little or nothing to do with variety, as red comes from the seed of yellow, and yellow from the seed of red pods. A Venezuelan variety has done extremely well and is also carrying its first crop.

Theobroma pentagona is also in fruit. This plot was planted in December, 1898, and is consequently just over three years planted. It is shaded partly by *Pithecolobium Saman* and partly by *Gliricidia maculata* the Nicaraguan shade tree. Our soil being a dry one, it is necessary to give some protection to the roots. This has been effected by covering the ground with vegetable refuse as a mulching. which has been effective in preserving the trees during a lengthy dry season. Grafting has been successful with all of the varieties, and there are now on hand, plants grafted upon stocks of *Thebroma bicolor* and *Herrania albiflora*, a *genus* nearly allied to Cacao; and a further attempt is now being made to graft upon stocks of *Cola accuminata.* The future must decide whether any advantage will accrue from the use of these stocks but the experiment so far is a successful one. I am more convinced daily that the practice of grafting Cacao of the best kinds will result in the production of samples for market, far superior to any now harvested. The process followed is to select trees having 1st, plenty of vitality, 2nd, of good size, 3rd. good croppers, 4th, bearing beans of the best quality. Plenty of such trees exist on many of the Trinidad estates, and it stands to reason that if a plantation of this kind is raised by using grafted plants a uniform sample of produce would be obtained of the highest excellence.

RAMIE. *

A. RIVIERE.

DURING the last fifty years Ramie and China-grass have been regularly cultivated in the French colonies, as well as in other countries, particularly in India and the Dutch colonies. During the American war the European manufacturers tried this textile material, but the production being insufficient, and the treatment difficult, the use of it soon came to

* Extracts from the *Report of the International Conference* held in Paris in 1900, M. Maxime, Pairs, 1901.

an end. The Universal Exhibition of 1878 gave it a new start, however, but the trade was still stopped by the inherent difficulties of decorticating and degumming the plant. It was thought that the Exhibition of 1889 would provide a solution of the difficulty,, but the results of the international Congress did not modify the position of the subject which was interesting the whole Colonial world. It is evident that the peculiar glutinous and insoluble matters which surround the fibres in the cortical layers present great obstacles to the mechanical and chemical treatment necessary for degumming. It made one fear that because the Ramie could not be prepared in a perfect and economical manner it could take no particular place in the textile industry, which was already well supplied with the principal known fibres—hemp, flax, and cotton. In other words, a new textile. dear and difficult to use, equal perhaps to flax but inferior to silk, was not wanted.

This was the situation in the French industry, particularly as our production of hemp and flax sufficed for its requirements. But this opinion altered sensibly in Europe when our crops were in danger of failure, and people began to ask if some day we should not be unable to obtain cotton, which our colonial possessions do not produce. The supply of textile raw material might fail from some cause or other, and already the cultivation of flax and hemp has nearly ceased in France, in spite of the premiums offered, which, in 1889, amounted to 2,500,000 francs (£100,000), equal to 92fr. 50c. per hectare about 30s. per acre.) France would then have to obtain from abroad all the raw materials used in her manufactures, and the question arose whether her colonies could not furnish to the home factories Ramie fibre, which seemed to be an excellent material, and could be largely used. Similar opinions seemed to influence other nations in their attempts to utilise Ramie. All colonial agriculturists seemed to think the easy cultivation of this perennial plant would admit of its competition in certain cases with cotton, while the manufacturers also hoped to find in its textile fabric an exceptional quality and firmness. The situation has thus changed. Ramie is really wanted by the textile trade, and its use cannot be prevented merely by some difficulty in its defibration—as that will be overcome.

The case is as follows :—The China-grass supplied by the Chinese to European manufacturers is insufficient for their needs. Its price is very variable—often very high. This raw material is sent to our market in the form of strips, which have been obtained by sundry manual operations.—scraping, soaking, drying,—which have caused it to lose a large quantity of the gum.

The manufacturers ask :—

(1.) If the culture of Ramie, which is at present confined to part of Central Asia, cannot be extended to other localities having similar or more favourable climate.

(2.) If the manual labour of the Chinese can be replaced by mechanical or chemical processes, so as to produce a cheap article, and at the same time preserve the quality of the fibre.

(3.) If the cultivation and manufacture of Ramie would pay, based on a similar price to that of China-grass, or even higher than the later, according to the state of preparation.

DIFFERENT KINDS OF RAMIE.

There are two kinds of Ramie plants which, if properly grown and prepared, would be bought by the textile trades in Europe in any quantity and at a very remunerative price,—

(1st) *Urtica* (*Bœhmeria*) *nivea*, or white China-grass.

(2nd) *Urtica utilis*, or *tenacissima*, green Ramie from Java and the Indian Archipelago.

The first will grow in temperate zones, but the second only in tropical or semi-tropical climates.

White Ramie.

One of the characteristics of this plant is the annual up-growth of the stems, which disappear in the autumn after having fructified. Another is the white down covering the undersides of the leaves.

This plant originates in China and Oriental Asia having been cultivated for centuries by the Chinese for their own use, the excess of production being exported to England under the name of China grass. It grows in temperate zones like the olive and orange, and flowers in the autumn, after which the stems dry up, showing apparently no life until the following Spring. It is of importance to cut the stems befor the flowering, or the fibre is spoil d. After experiments made in different climates it has been found that the *Urtica nivea* is unsuitable for tropical or semi-tropical countries, as the abnormal growth and constant flowering prevent the stems from maturing, and reduces both the quality and quantity of the fibre. It thrives, however, very well in temperate zones, where the heat is not excessive in the Spring and Autumn, and where only slight frosts occur in the Winter. It may be laid down as a general rule that the growing of *Urtica nivea* will not give good economical results in any but a temperate zone, the extreme limit of which is to where sugar-cane and bananas can be grown. This plant fructifies abundantly and the seeds are fertile; in the experimental farm in Algiers, very large crops have been obtained during the last 40 years.

Green Ramie.

This species, *Urtica tenacissima* or *utilis*, is distinctly, characterised by having perennial stems and the undersides of its leaves almost green, but sometimes very slightly covered with white down. It is a native of Java and the Indian Archipelago, and for industrial purposes ranks equal, if not superior, to China-grass. It grows like a shrub ; the stems speedily throw out branches and become ligneous, rapidly increasing in height and diameter. It lives for several years, and the flowering is not followed by the drying of the stems, as is the case with the white ramie. The flowering periods are not numerous, and it rarely produces any seed. In good moist soil, this nettle will take the form of a shrub up to 16 feet high, but in poorer dry soil it becomes a mere bush. The green ramie with its enormous growth is thus most suitable for tropical districts having constant rains or irrigation in periods of drought. Under such conditions this plant rapidly produces stems 6 to 7 feet in height, which should be cut for treatment in the green state, before the appearance of the side-shoots, but when having arrived at a certain degree of maturity. A peculiar characteristic of this ramie is that when a stem is cut, leaving a fair size stump, this stump will throw out side shoots which develop into high stems. This, on the contrary, never happens with the white ramie, the stems of which are annual, while the shoots spring from the root. There was for some time a doubt as to the industrial value of green ramie, though its richness is magnificent, strong fibres was well known ; but lately the difficulty in its mechanical and chemical treatment has been overcome, and many manufacturers now prefer it to the white ramie.

This is of importance to the cultivator operating in warm climates, as the constant and exuberant growth of this species enables him to get several crops and a correspondingly better financial return.

This ramie is now sufficiently well known in the trade and should give any grower an excellent result in suitable localities, that is, in warm, moist climates, where the vegetation is not interrupted by insufficiency of rain, or where irrigation can be applied during dry periods.

TREATMENT OF RAMIE IN A DRY OR A GREEN STATE.

The methods of treating the stems are of great importance to the grower, as the price obtained

depends on delivering to the manufacturers the article most suitable for their machinery.

The treatment when in a dry state necessitates full grown stems, which in temperate zones will only permit of two crops per annum; while, on the contrary, when treated in a green state the stems need not be so fully developed, and several crops can be obtained.

Treatment in the dry state.—It is difficult to explain why so much attention has been paid to this mode of treatment. No earlier records give any indication of it; in fact the people of Asia, notably the Chinese, who for many centuries have used the nettle fibres, have never prepared them in a dry state like flax and hemps are treated; on the contrary, they decorticate them absolutely green, and remove the bark while the stems are growing. It would be a false economical basis for one to compare ramie with flax and hemp; believing that unique advantage of the dry treatment consists in the ability to store it in stacks or sheds, until an opportune time for decorticating. The grower might then perform this work in the winter time when other labor is slack. In France, and even in those parts of Europe most favoured by the climate, it would be almost impossible to dry the stems in the open air. Moreover as regards France, the growing of ramie does not seem to have given very satisfactory results. Even in the colonies the moisture of the air is too great to enable us to obtain, by open-air drying, stems sufficiently dry to suit the decorticating machines at present in use. In India and China where the growth of ramie is very abundant, and labour very cheap, it is impossible to get the stems, even comparatively, dry in the open air, and any attempt at storage will lead to fermentation, and consequantly the fibre will be spoiled.

The dry stem is also hygrometrical, and rapidly absorbs the moisture in the air, as has been proved by experiments with stove-dried plants.

Insufficiently dried stems cannot be decorticated satisfactorily, as the beaters and scrapers of the machines acting upon a soft spongy matter, weaken, and soil the fibres, without fully removing the woody part, or even the cuticle. When exposed to the air this latter becomes of a brownish colour, hard and horny, resisting all efforts to remove it by machinery

The strips thus obtained can only be cleaned and deprived of cuticle and gum by means of chemical baths, which often have to be so strong that they damage the quality and strength of the fibre.

The machines for dry work require to be fed with well-grown stems of fairly uniform diameter, in order to produce good strips.

If the stems are cut before maturity they often becomes flat and out of shape in drying, and the machine does not act uniformly on all the surfaces, but leaves a good deal of woody substance in the strips. With well grown and perfectly dried stems, certain machines do good work in removing the bark and woody part, but the strips retain the cuticle, which is very difficult to get rid of by the chemical baths used for the purpose at present. All these objections apply when the stems are passed through the machines as a first operation after being dried; but we hear of a new method of first submitting them to chemical action, and then decorticating.

So far the decorticating has been found very difficult, particularly in tropical humid climates, where the crops are very heavy.

It often involves manipulations very costly to the cultivator, and is some times impossible if he has to cut the crop and spread it over large areas to dry.

Some authorities contened that drying in stoves is the only effectual mode of getting rid of the moisture but that is impracticable, and would greatly increase expenses.

Treatment in the Green State.—It is very easy to decorticate the ramie stems in a green state, and the Asiatics use only this method in treating their fibre nettles. Immediately after the stem is cut there is no difficulty in removing the bark and woody part, on account of their moist state, without many fibres adhering to them. The Chinese, in fact, often decorticate the plant while growing. Many decorticating machines have failed to give satisfactory results because they have been fed with only comparatively green stems, which have already lost a good deal of their vegetable moisture. This leads to a question important for both cultivators and manufacturers. At what stage of its growth ought the ramie to be cut, or in other words what is meant by green stems? Recent experiments demonstrate that the best time is just after the stems have reached their full height, when still herbaceous, soft, and succulent, and when the bark has formed, but not become brown. At this period, before the appearance of the eyes at the axils of the leaves, the primary useful fibres are already formed, and have sufficient strength; but afterwards only layers of useless fibre are produced. It is therefore clearly a mistake to let the bark thicken, hardening the epidermis and increasing the woody part. In time the fibres lose their fineness, flexibility, and whiteness, in short, their most valuable quantities, and become more and more surrounded by the hardened cuticle and gum, two substances which are very difficult to get rid of when ancient.

To minimise the formation of these deleterious substances the plants should be pretty close-set and well watered, to induce a rapid lengthening of the stems. In a thick plantation, there are very few leaves at the base of the stem, the ramifications are not developed, and the atmospheric influences act less directly on the cuticle, which consequently remains softer and thinner.

In warm and temperate climates, with good irrigation, as many as five successive full-grown crops have been obtained per annum; and in tropical climates with regular and abundant rains, still more. The use and value of green ramie stems depends entirely on their treatment, and if by certain instruments or machines, the bark, woody matter, and cuticle can be removed without damaging the fibre, and the liquid gum pressed out, strips of fibre will be obtained divided in numerous filaments, and free from a great portion of the useless elements. Care must be taken, however, that the beating and scraping be not too violent or the fibre will be injured.

In order to prevent the hardening of the remaining gummy matter, some authorities recommend that the strips should be placed in a chemical bath, immediately after being taken from the machines. Other authorities would soak the green stems first, or subject them to the action of a certain gas, then dry and work them mechanically. This preliminary treatment by liquids or gas would change the gummy matter to a powder, and when the stems were afterwards well dried, decortication would be easy, by means of beaters or stripping machinery.

These operations refer to the green stems, which do not require to reach maturity in order to provide good fibre, and taking everything into consideration are much easier to treat than the dried ones. The fibres are of a superior quality, and one may cut four times the number of crops—which point is of vast economical importance in warm climates where the stems reach a height of about 5 feet in thirty-five to forty days, when well watered by regular rain, or irrigated.

THE WEIGHT AND VALUE OF THE CROPS.

The results of the crops vary according to the localities, the number of cuttings per annum, the system of treatment, and the skill of the labourers, which makes it impossible to fix a general standard revenue per acre. In taking the gross weight of the yield per acre of green or dried stems, we only obtain a very aproximate estimate of the initial value of the crop, as the quantity of useful fibre is not in proportion. The weight of the green

stems is generally taken by the purchaser as a basis for his calculations; but this is subject to great variations, and often a great loss of vegetable liquid takes place in an incredibly short time, when the atmosphre is dry. Then the stems have more or less leaves and are more or less compact, according to the season, which causes the weight to vary. In fact, some stems grown in the summer have been found of inferior weight to those grown in the spring, though of the same demensions. In a carefully cultivated hectare (2½ acres) we find from thirty to forty stems per square yard, about 64 inches high, which means 400,000 stems per hectare each crop. The average weight of free fibres is about 3 to 3½ grammes per stem. or 1,200 kilos (one kilo=2 1/5 lb.) for 400,000 stems, and for four crops per per annum 4,800 kilos of "filasse" (fibres not quite completely degummed). Supposing, in round numbers, a yield of 4,000 kilos of degummed fibre per hectare, the sum realised at the present price of 850 fr, per ton would be 3,400 fr. (£135, or £45 per acre). It is impossible to estimate the exact profit to the grower on account of the varying conditions of production in different localities, but an average minimum of £10 per acre may be counted on, and though the first cost of planting is considerable, the maintenance of the plantation is very simple and inexpensive. To estimate the value of the crop by the gross weight of the stems often leads to serious discrepancies. Though 400,000 green stems weigh, as a rule, 18 to 22 tons, they lose rapidly in weight by evaporation and falling of leaves, and sometimes the same number of stems only weigh 15 to 18 tons, though containing no less weight of fibre than the heavier ones, This depends on the season, the quantity of moisture they hold, and the number of leaves. The profits on ramie growing depond on—

(1) Whethor the cultivator sells his crop growing.
(2) Whether he prepares it more or less by decortication or other means, when he will have the profit also on this supplementary work.

In the latter case it is the production in fibre which must be considered, but this varies in quality and cost, according to the processes it passes through, and which are more or less costly.

Those interested in ramie seem to have constantly tried to obtain, by mechanical treatment, an article equal to China-grass, and have not thought it necessary to preserve the original great length of the fibres or their parallelism. Some of the decorticating machines, which operate quickly and have a large production, cut the fibres. This, however, makes it more convenient for the manufacturer, as, when entangled, the long filaments are difficult to comb.

It is quite clear that if we, by a simple preliminary process can eliminate the expense and risk of degumming the raw material later, the product from this treatment will have a very different value to the manufacturer from that of the ordinary coarse strips, and a large daily production does not necessarily mean a larger profit. The growers and manufacturers have, perhaps, hitherto been wrong in seeking only to produce a rich and superior article, and the description of ramie, as a *vegetable silk*, has done harm. The large textile factories seem really to require a fibre of good quality, but ordinary preparation, which they, by ulterior manipulation, can convert into superior goods. The aim should be to produce ramie fibre at a price between that of cotton and linen, when, according to certain economists, the consumption would be unlimited.

THE CLIMATE MOST SUITABLE FOR RAMIE GROWING.

A warm climate with frequent rains, amounting to a total of 8 feet or more per annum, or abundant irrigation in places where there are dry periods, suits the ramie plant best, and where the temperature does not fall below freezing point.

MODE OF CULTIVATION.

There is no doubt that plantations on a large scale, where machinery can be used for cutting and decorticating, will pay best, as the manufacturers require large quantities of a uniform quality, which can not be assured when buying small lots grown in different parts. Decorticating and degumming should be done on the spot to prevent fermentation, as it is almost impossible to avoid damage—at any rate to the interior of bales of gummy fibres when shipped long distances. China-grass can be transported safely because it only contains about 25 to 30 per cent. of the original gum.

The cultivation of ramie is very simple, and consists principally in a thorough preparation of the soil. It should be planted in good deep soil, tho clayey, silicate, calcareous, and that rich in humus being the best for the rapid production of good crops. In regions where there is not a regular rainfall irrigation must be resorted to.

The preparation of the soil consists in—

1. A deep ploughing (by stream plough preferably).
2. Working the surface light.
3. Making irrigation channels spaced according to the volume of water at disposal.

The land should be level, and the plants or roots placed 10 to 12 inches apart in shallow furrows, spaced about 12 inches. After closing the furrows the plants must be watered. Planting in ridges is not to be recommended. After the soil becomes dry it should be worked over again twice.

In a plantation spaced as above it will be found impossible to dig after a lapse of two months, and irrigating only has to be attended to. In a few months the growth will have become so compact that all labour is impossible and useless. The annual work is then limited to irrigation and to applying periodically artificial fertilisers, such as nitrates and superphosphates. In fact, the principal cost of growing ramie is at the commencement, and may be calculated according to the price of labour in the locality—

1. Deep ploughing.
2. Keeping the soil light.
3. Planting 1 hectare (2½ acres)=two or three days' labour.
4. Cost of plants.
5. Digging up several times.

The price of plants in a locality where ramie is grown is about 4s. per 1,000, but of course in other places one may have to pay considerably more.

A good European mower can cut by hand and put in small bundles about 2,500 stems per hour; but the mechanical reaper is quite suitable for green ramie. If the process of treatment necessitates tho stripping of the leaves, an adult woman can do about 400 stems per hour, and it is best to do it before cutting.

A good ramie field should show close and even growth like a field of wheat when the stems will be straight, have few leaves at the base, and the sun less tendency to harden the cuticle. On an average, one should have about forty stems per square metre (=33 per square yard) as a minimum, but we often find as many as fifty-eight large and twenty small stems of white ramie and forty-five large and fifteen small ones of green ramie per square metre.

The diameter of the stems of the green ramie is generally larger than that of the white.

If cultivated under favourable conditions, the annual fibre production per acre is superior in quantity and quality to the high-priced *abaca* and *sisal*. This will give an important place to ramie in the textile industries, if the preparation is economical.—*Agricultural Gazette of New South Wales.*

GOVERNMENT HELP TO SELANGOR PLANTERS.

THE BEE HAWK MOTH.

SIR,—So many of your readers are now either directly or indirectly interested in the Malay Peninsula, that I make no apology for asking you to allow me to utilise your columns to record another of

the many instances of Government assistance which has been extended to planters and others in the Federated Malay States, when cases of real urgency have arisen.

About six months ago, an estate which I visited, the property of a Company which has large Ceylon interests also was attacked by the caterpillars of the bee hawk moth; for some time we were able, though only at a heavy expenditure, to keep pace with the pest, and to an inexperienced eye, the coffee showed scarcely any signs of being denuded of leaf. In June last, however, owing probably to some climatic change favourable to the rapid development of the insects, there was a terrible increase in their numbers and it became apparent that, unless a large force of coolies could be at once concentrated on the spot, the most serious result must ensue.

Neighbouring planters came to the rescue, and lent every coolie they could spare, but still we could not keep up with the carterpillars. I then appealed to the Government and at once a special train was put on and nearly 200 coolies daily were sent down. These men had to walk, in some cases, a long distance to the railway station, and on arrival at their journeys end, nearly four miles more to the estate lay before them. After work they had to go all the way back again. There was no suggestion that such a day's labour was an impossible task, and the men all worked cheerfully and well. With this help we were able to get the pest in hand and in the end were only called upon to pay half the cost, the Government defraying the rest.

You will agree, I feel sure, that such ready sympathy and liberal and prompt assistance are not to be met with in official quarters all the world over, and deserve to be made known, especially in quarters where the proper significance of the thing can be appreciated.

Mr. Ernest Green, with whom I have been in communication, tells me that the bee hawk moth is well-known in Ceylon, but is not epidemic over with you owing to some fungal or bacterial infection, and this it is to be hoped may in time become an established condition here too; but, meanwhile, we can do nothing but "hand pick" eggs, caterpillars and chrysalids, and meet every flight of moths (which are day insects and therefore not to be caught in the meduse acetylene lamps) with as many butterfly nets as we can muster coolies to use them.

Somewhere about 1885, many of your readers will remember how the cinchona was absolutely stripped of leaf by a huge hawk moth caterpillar, which appeared in such numbers that one even found them crawling over the bungalow walls. The Badulla district in particular had a bad time of it, but finally thousands and thousands of crows came to the rescue, and absolutely cleared the caterpillars out. Having this in my mind, I approached the Resident-General with the object of seeing whether the Government would negotiate with Ceylon for the supply of a few thousand of crows, these useful birds being very few and far between over here unfortunately; and I am glad to say that, instead of treating this suggestion as a huge joke, as many men might have done, Mr. Treacher has at once put himself in communication with your Government on the subject.

I hope, Sir, if you notice the matter at all, you will accord your support. You might send us over 100,000 crows and never miss them; in fact, the effect would probably be as beneficial to the remaining stock as shooting over a moor which has for years remained undisturbed—Yours, &c., E. V. CAREY,

Kiang, Selangor, Federated Malay States, August 3rd 1902.

FEVER IN PLANTS.

Although animals and plants seem, at first sight, to be two absolutely distinct groups, and to have little in common, closer investigation points unmistakably to the fact that they are very similar and very closely related to one another. Further, many organisms are known which it is impossible to class with certainty as plants or animals. Let us confine our attention for a moment to one of the ordinary recognised signs of life, namely, breathing or respiration. Both animals and plants breathe. In both oxygen is taken in from the air, and after certain changes carbon dioxide is given out. This process, it is true, is masked in green plants, during exposure to sunlight by another process in which carbon dioxide is taken in and oxygen given out. It goes on, however, in a plant as steadily as in an animal, and there is no essential difference between the respiration of man and that of the humblest vegetable he cultivates. In man it is not uncommon to find that when the health is affected his temperature rises; in other words, he becomes feverish. At the same time the rate of breathing is often increased. Is this true of plants also? Can we throw a Potato or an Onion into a fever? The idea seems absurd. Yet it is an ascertained fact. It was shown by Mr. H. M. Richards (*Annals of Botany*, vol. xi., p. 30) that if Potatos or Onions were sliced—that is to say, wounded—their temperature rose, and their breathing became more vigorous. They exhibited in fact two of the characteristic symptoms of a feverish person. The rise of temperature was carefully measured; in some cases it was as much as 3° C. The course of the fever was followed, and was found to reach its height usually about twenty-four hours after the injury, the temperature then began to fall, and reached the normal again on the fourth or fifth day. Experiments such as these help to bring home to one in a striking manner the fundamental relationship between animals and plants.—*Agricultural News, Barbados.*

PLANTING NOTES.

Sweet Peas in Quantity.—We are informed by Messrs. E W. King and Co., Coggeshall, Essex, that they have now in flower 6 acres of Sweet Peas, including seventy-two choice varieties cultivated for seedling purposes.—*Gardeners' Chronicle.*

Manure for Roses.—Artificial manure, says a German contemporary, if properly chosen and applied, are the most useful, as by their use vigorous growth and fine flowers are obtained. Raw bone-meal, in point of usefulness, is preperable to manures containing phospheric acid; but the manure most to be recommended is potash, and two dressings afforded during the summer have all the favourable results which one can desire from a manure. —*Ibid.*

A New use for the Onion.—The onion has been recommended as a beneficent remedy for diseases in poultry on account of the essential oil, which causes tears to flow from the eyes; hence therapeutic qualities of great value are attributed to it in the case of throat affections in said poultry, which, as we well know, is the disease which decimates our poultry yards. The administration is very simple: Once or twice a week cut up the onion into very small pieces, and feed it to the poultry. It will keep them in excellent condition for fattening and producing plenty of eggs.—*La Industri*, Nicaragua.—*Ibid.*

"Agricultural News."—We have before us the first number of a fortnightly periodical, published at one penny at Barbados. It is one of the many evidences of the activity of Dr. Morris in all that concerns the development of the agricultural resources of the West Indies, and lays no claim to public recognition beyond an earnest desire on the part of the Imperial Department of Agriculture to instruct and assist all classes of the community, and to promote the agricultural interests of these colonies. The contents, though naturally devoted almost exclusively to colonial affairs, are varied and interesting.—*Ibid.*

VANILLA.

CULTIVATION IN THE SEYCHELLES.

In various localities in the West Indies attention is being directed to the cultivation of Vanilla. Experiments on the growth of the plants and curing of the pods are being conducted at some of the Botanic Stations, and planters are also putting the question of the possibility of the industry in the West Indies to a practical test. We have already referred in these columns to the vanilla industry of the Seychelles (*Agricultural News*, p. 60.) The most complete and exhaustive account of the cultivation as practised in those islands is that of Mr. S. J. Galbraith, published in 1895, as *Bulletin No. 21*, Division of Botany, of the U.S.A. Department of Agriculture. Mr. Galbraith was 'for many years a successful planter in the Seychelles and in a most favourable position to write on the subject.'

We propose to reproduce the greater portion of this valuable publication in these pages. The present article contains a summary of the general conditions of the industry in the Seychelles and the directions for the arrangement of trees on which to train the vines :—

GENERAL CONDITIONS.

"If kept free from disease the vanilla is a plant of extraordinary vitality; and in the Seychelles, where moisture and heat, its main requirements, are both ample, the sort of soil it is grown seems to be of no great importance, provided that, if it be very poor, the roots are kept well supplied with manure. It is cultivated in the Seychelles from near sea level to 1,800 feet altitude, and does well (except for disease) at all altitudes between those extremes.'

The rainfall is about 100 inches in the low lands and 10 to 30 per cent. greater in the hills. The fall is fairly evenly distributed throughout the year, but a dry spell, which is necessary to bring vanilla into flower, is to be looked for in July, August, or September, while the heaviest rains most frequently come in December. The range of shade temperature for day and night, from sea level to 1,800 feet, may be put at 90° to 70° F. The former is exceptional, the latter frequent. The plant does well in three very different types of soil,—a rich vegetable mould, a greasy red clay, and a coarse quartz sand. Though so unpromising to look at, the latter is, perhaps the best of all. It gives free drainage to the roots, and in wet years plants fixed on it are more likely to crop than those on closer soils, while with ample manuring they grow remarkably well.

ARRANGEMENT OF PLANTATION.

The manner of setting out plantations in the Seychelles has undergone changes within the last years. Formerly plantations were seen with the rows of vines planted so close together as scarce to leave room for workers to pass between them. The yield per acre under such conditions was sometimes enormous, but when disease once started in a vanillery thus arranged, its destruction was rapid and complete, so this system has been mostly given up. Since the loss of so many close-lined plantations, the distance between the rows has been increased. Living wood, i.e., small trees, are used as supports for the vines, these being festooned from fork to fork, but many planters have made use of hard wood posts and bars, the former being notched on top and the latter laid in the notches resting thus from 4 to 6 feet from the ground, according to fancy. Over these bars the plants are hung being looped up as growth is put on. Wire is sometimes also used instead of horizontal bars. It is much cheaper, but otherwise has disadvantages notable among which is that it sways with wind and is liable to break the vines, the curvature being too sharp over such a small round surface. However, when plants thicken into a mass this last drawback mostly disappears.

A third, and, as the writer believes, much better way of growing vanilla, is now more generally coming into practice. This is to plant each creeper on a tree of its own, and where land is cheap it is an advantage if these are well apart. So arranged, the general maintenance of a vanillery is certainly more expensive, inasmuch as isolated plants require more manure than when the same number are closely grouped together. The work of flower pollination and crop gathering is also more laborious. But more than a counterpoise to these disadvantages in the increased security this method of planting gives against wholesale destruction from disease; for when so arranged a sick plant can be removed and destroyed with greater chance of this being done before any of its neighbours become affected; whereas when growths of different plants are interwoven, either in their roots or shoots, it is difficult to know when enough has been taken up and there is every likelihood of the disease becoming established beyond control.

USE OF TREES AS SUPPORTS.

To give some notion of how a vanilla plantation is set out and carried on in this Colony, it will be convenient to assume that the tree method of planting is the one adopted. A great variety of trees will serve the purpose. Here, on most properties, there is an abundance ready for the work; but of course where this is not the case, suitable trees must first be planted. In selecting trees those should be chosen which do not grow too large, but give moderate foliage (about half shade) without ever losing all their leaves at once, and having plenty of branches from 5 to 7 feet from the ground, affording forks enough to train the vines through.

No hard and fast rule can be laid down as to the distance trees should be kept apart. Here, formerly as above stated, vanilla was grown in dense masses with great success for a time. Elsewhere it may be advantageously so grown now. However, it is safe to state that overcrowding in any kind of planting invites disease, and the farther plants are kept apart the more likely are they to remain healthy. A 4-foot radius would be a moderate allowance for the roots of a vigorous vanilla plant, and if 1 foot is kept clear around the circle allowed to each plant's roots this would give 9 feet as the distance between the trees. It would be difficult to insure the plants being kept distinct in less space. Where suitable trees are already growing on the land to be planted these can be thinned out if too close, or they may be left in small lots of three or four or more together, a sufficient clear space intervening between each lot; but in that case if one vine of a group showed disease the whole would have to be removed. Many trees stand topping, and it is a great advantage when they do, for on being cut 7 feet or so from the ground branches spring from near the cut part at a convenient height, and the best situated of those can be chosen to train the vines through, the rest that grow awkwardly being removed. About 5 feet from the base is low enough to allow any to grow.

PLANTING.

Trees being in readiness, planting may be done at any time of year here. If during a wet spell, vanilla will sprout all the quicker; should it be dry, the plants will delay a little, but there is no fear of their missing if properly planted, and the one danger point to guard is where the vine leaves the earth. This part of the vine is burnt through if not shaded with grass or leaves. However, this also would only mean a little delay in the start of growth; for though they take some time longer about it, vanilla cuttings will grow well enough if merely tied to the trees with their lower ends some inches clear of the ground. Illustrative of the extreme vitality of plants under adverse conditions, it may be mentioned that in neglected plantations, where the vines have been allowed to climb well up into the branches of good-sized trees, and then been broken in attempting to get them down, the broken portions, sometimes partly swinging free, have remained green and capable of

growth for upwards of a year, sending down long aerial roots 15 or 20 feet in length, and in some cases where these have escaped injury the broken plant may re-establish connexion with the soil and start to grow again. If planted clear of the ground and merely tied to the supporting tree, it is advisable to tie two or three large leaves round each vine for the distance of 3 feet up; thus shaded the aerial roots quickly burst through the stem, and getting something to cling to at once, soon make their way to earth without injury.

LENGTH CUTTINGS TO USE.

In starting a new vanillery, where the estate has no plants these are readily purchased here at small cost. from 2 to 3 rupees (55 to 90 cents) per 100 fathoms is the usual rate for cuttings, the fathom being what a man can span with outspread arms, a good sweep of the vine hanging in a curve between his hands. Where choice is possible, although oldish cuttings will grow pretty well, it is best to have the plants of recent growth; in fact, growing shoots, cut off close to where they spring from the parent vine, are preferable At their point of origin the nodes for some distance are close together, and though roots will strike from any joints, they have a natural tendency to do so quicker at the shoot's base. As to the length of cuttings to plant, opinions differ; but there can be no question that the longer cuttings produce cropping plants sooner than the short ones. If a 2 or 3-foot branch is planted, the shoot it gives is invariably more slender and slower of growth than would be that from a 6-foot cutting, and up to 10 or 12 feet every advantage lies with the longer plants, except the additional expense

The question as to whether cuttings of that length are to be planted whole or divided into two or three plants should be settled by their cost. It is usual here to loosen the soil with a hoe where vanilla is to be planted, and bury the end, laid horizontally, an inch or two in the earth. Quite as good a way is merely to press the lower part of the plant into the soft soil until it is flush with the surface, On sloping land loosened soil washes away sooner with heavy rain, and in such situations it is better to leave the ground quite undisturbed. In any case the leaves on that part of the vine which rests in or on the ground are cut off fairly close to the stem, and an arm full of leaves, fern, grass, or forest sweepings laid on the top to the depth of 3 or 4 inches, for a couple of feet around the plant. Its roots will not need to be mulched for a greater distance than that for some months to come, and to cover a larger area would be useless As new top dressings are laid on, which must be done when the first supply rots down and becomes thin, these can be gradually extended to allow of more root spread, till the limit of 4 feet radius is reached, If well covered, the roots do not run much; only starved vines run far with their roots, seeking nourishment; where this is plentiful they mat in and beneath it. Being entirely surface feeders, should any make their way beyond the cover they can be gently lifted and tucked under the decaying leaves, etc.; but this is a hint that the plant needs a new supply of top dressing. The number of joints laid on or in the soil will vary with the length of the plant, but should not be less than three for this mode of planting, while for long cuttings six or seven joints are needed for a quick start.

SUPPORT FOR THE YOUNG PLANTS.

If of sufficient length, the free end of the planted vine is hung through a fork of the supporting tree, but it is also advisable to tie it in two or three places to the tree to hinder swinging and chafing. The material used for these ties here is a fibre called *Vacoa** which rots in about a year, by which time the plants should have tendril-like roots enough to steady themselves. When once properly planted the cuttings will need little or no attention for some months, but when the growth becomes vigorous the shoots must be looked after. Such of them as have grown clear of their supports are hitched up and if long enough, hung through one of the forks. An occasional tie here may also be necessary, but in general, a leaf or two of the growing part can be hooked on to some other fixed part of the vine, and in a few days unless blown loose, the tendrils will have fastened to the leaf, and thus support the plant. Shoots must not be allowed to climb very high among branches of the supporting tree, especially if there be many and close together, or there will be breakages in getting them down. For this purpose, when they get beyond hand reach, a forked stick 6 or 7 feet long is useful. The fork is worked between the tree and climbing vine, and its tendrills in succession are broken by pushing and twisting the stick when they are within the fork. The last two or three tendrils are easily broken or leave the tree without breaking, and care should be taken when the vine is nearly clear to catch the stem of it high up, within the stick's fork; it can then be lowered gently without fear of breaking.

Some judgement is necessary in selecting the fork of the tree through which each shoot is to hang, a fork whose height fits in with a natural bend of the vine, if it has one, being chosen; otherwise one whose height takes the vine between joints is best, since if bent at a joint the vine is apt to snap, especially so when in vigorous growth, being then full of sap and brittle. In good growing weather—i.e., warm, still, and moist—healthy, well-nourished vanilla vines grow very rapidly, an inch per day being no uncommon rate.

PREPARING THE VINES FOR CROPPING.

If the plants have done well they should be ready for such preparation in about eighteen months, more or less, according to the season. Formerly in in this colony they were allowed to grow on until a spell of dry weather set in prior to the usual blossoming time. The growing ends were then cut off and all new shoots removed as they showed till flowers began to come or till the season for them was past. When the dry spell proved a long one, this seemed to answer pretty well; and, indeed, under these circumstances flowers would come in any case, whether growth was checked or not. But now it is more usual to stop the growing ends some nine or ten months, in the first instance, before flowering time. In the majority of cases the terminal bud will push, and this new shoot should also be removed when 5 or 6 inches long not earlier, else the next to the last bud is apt to grow.

After the second checking most vines will shoot far enough back to allow of the shoots being left These grow on for the next year, and then stopped branches hang down with their lower ends a good foot or more from the ground, being generally from 4 to 6 feet in length, according to the height of the forks through which they are hung and the positions of the new shoots, though these generally spring just before the last bends of the checked branches, which are to be the cropping parts. The new growths behind these are supposed to drain them of their sap, and thus conduce to flowering. However that may be, these checked hanging branches, have certainly more tendency to flower than other parts of the vines. Flowers take some six weeks to develop from the moment they burst through the buds to their time of opening, but this period varies in length with the weather, continuous dryness retarding and moderate showers hastening their development when once started.

The growing branches of vines should now be checked again for the following year's crop. These will be less troublesome in putting out inconvenient shoots, as the plant's sap is more apt to go into flowering branches, when nourishment is now more needed, Could the whole work be performed in a few

---

*Obtained from a species of screw pine, *Pandanus utilis*.

days, this change in the direction of sap flow should be done preferably ten days or a fortnight before flowers begin to open. In a large plantation, unless the hands are very numerous or the shoots have been arranged beforehand so that there is little else to do than cut their ends, it will take some weeks to accomplish this, and therefore work must begin earlier or finish later. If the dry spell necessary for flowering has lasted a good while and can fairly be depended upon to continue long enough, the growing ends may be cut earlier; but it must be borne in mind that if rain in quantity comes too soon and, in addition to the stimulus given by it, the branches intended for flowering have also the sap from previously growing shoots poured into them, the chance of their cropping well will be much diminished. Many a promise of a fine crop is ruined by too early rain here. The country, climate, and the planter's skill as a weather prophet must govern this undertaking.

An abundant supply of leaf mould should be in readiness for laying on the roots at this season, and should be applied when flowers begin to open, or a little before. If previous dressings have be so timed that vines are in a somewhat starved condition when flowering is expected, the chances of a good blossoming are increased, but the practice needs judgement, or a poor quality of pods will be the result.

There used to be a story current here, no doubt with some grain of truth in it, to the effect that in a very wet season the only vanilla planter who had any crop was one whose pigs had got adrift in his plantation and spent the night in grubbing up vanilla roots. This method of producing flowers is not recommended but it is quite possible that careful and systematic root pruning might be carried on with advantage in wet years, if one could tell beforehand when these were coming.

POLLINATION OF THE FLOWERS.

The work of flower fertilization (pollination)—for they have all to be fertilized by hand, and than on the day they open—is mostly done by women and children. The operation is a very simple one, and an average negro will acquire the knack after being shown a few examples.

[The illustration on the opposite page, reproduced from the *Kew Bulletin*, with its descriptive letter press will allow readers to follow clearly, Mr. Galbraith's description.—Ed. *A. N.*]

The flower is taken in left hand, three fingers been placed at its back and the thumb in front the column with organs of fertilization on top being supported against the middle speal behind. A bit of hard wood, cut to the size of a toothpick and scraped smooth and flat at one end, is the only tool required; this is held in the right hand. To get at the organs of fertilization easily, the sack which grows from the side of the column enveloping its front and marking the sexual organs is pressed down by the bit of wood, or this is run through its base, and the sack torn up, or the whole sack may be plucked off with finger and thumb, it matters not how it is laid open, so long as this is done quickly and without injury to any other part of the flower. The smooth end of the fecundating instrument is then laid flat on the front of the column just beneath the organs of fertilization, and being pushed up it catches under the flap which keeps the pollen from coming into contact with the stigma. The flap is raised along with the stick till it lies flat against upper part of the column, being held in that position by the bit of wood. The stamen, at first raised along with the flap, now falls down again in its original position, and the flap being out of the way the pollen comes into contact with the stigma, and a slight pressure of the thumb on the stamen lodges pollen in the position required; the bit of stick being then quickly but gently withdrawn, the operation is complete.

The whole affair is very much easier done than described, and with flowers fairly numerous, an ordinary hand will fecundate a hundred or so per hour. Early morning, from 7 to 9, is the best time for fertilizing; but the work may be started with sunrise and carried on well into the afternoon, though about mid-day flowers begin to close some and the work goes slower. Most plants in full crop produce many more flowers than it is advisable to fertilize, for other parts of the vines, besides the checked hanging branches, blossom in favourable seasons and the number of pods which a vine is able to mature properly must be estimated from the plants size and condition. In the course of four or five years, though by that time the plant cutting willl be spent, if well cared for it will have grown a large quantity of vine; and as each new shoot, when long enough, sends down aerial roots in its own behalf, it becomes, so to speak, an independent plant and the parent of others. If none of the shoots from a strong growing vine have been removed the mass of growth in time becomes enormous, and may be equal to maturing a hundred or more good pods. When the supporting tree is stout and furnishes forks enough to admit of the vine being spread out so as to let plenty of air through it the vine may be allowed to accumulate to this extent, and if it gives, twenty clusters, each yielding ten or more flowers, five or six might be fertilized on each.

But, generally speaking, about 30 pods to a vine is as many as should be left, and he would be a lucky planter who should average that number. In selecting flowers to fertilize those should be chosen which spring from the lower part and from the sides of the flower stalks, from which position they grow straighter pods than those coming out on top. In favourable weather, i. e. moist but not heavy rain (which latter often washes the pollen grains away before they germinate), only a small percentage of flowers will fail of fecundation. In case of failure, the flower drops off in three days or less, but otherwise remains attached to its stalk and slowly withers; the *gynostemium* adheres to most pods till they begin to ripen; thus it is easy to see the number successfully fecundated in each bunch, and where enough are secured the rest can be broken off. Later it is advisable to cut clean off with a knife the flower stalk a quarter of an inch or so beyond the last fertilized flower. Some planters plaster a bit of sticky clay on the cut surface to prevent it rotting back. Dry lime is perhaps better; this may be dabbed on with a piece of cloth dipped in the powder

Pods grow to their full size in five or six weeks, but take some eight months, more or less, according to the altitude at which they are grown, or the amount of shade over them, before they ripen. The indication of ripening is a slight yellowing of the whole pod, which is more marked near its free end. When under too much shade the change in colour is less noticeable, and many pods grown in such places split before they are gathered, and for that reason lose in value. To guard against splitting, and yet gather them at perfect ripeness, they should be gone every other day, In removing them from the flower stalks the pods are grasped one by one near their attached ends, very slightly twisted, and at the same time pressed aside with the thumb. They must be taken off quite clean. If a bit of the flower stalk comes away with a pod, as sometimes will happen it should be cut off smoothly. Any break or crack in the pod itself, however near its butt, ranks it is as an inferior quality. Buyers are very particular in this respect. After each day's gathering, before the pods are started on their first stage of curing, it is well to sort them roughly into four classes: 1, long 2, medium; 3, short and 4, split.

1—portion of stem of Vanilla plant, with leaf, aerial root, and cluster of flowers; *a*, front view of Vanilla flower; *b*, side view; *c*, aerial root, with root hairs.
2—Single flower of Vanilla, exhibiting the first stage in the process of artificial fertilization. The operator, provided with a finely-pointed piece of bamboo, divides the lip or labellum medially, so that the central lobe is seperated from the two side lobes. This exposes

the column and organ of fecundation. The instrument is represented as placed against the column, ready to press upwards the anther *a*, and bring the pollinia in contact with the stigma *b*.

3—Single flower of Vanilla, exhibiting the second stage in the process of artificial fertilization; *b* shows position of column exposed by division of the lip [the middle lobe of lip is pulled forward and curled upon itself to show the position of the column; the side lobes of lips, seperated as shown in Fig. 2, are represented at back of the column]; *a*, the position of pollen masses, taken from the anther and placed on the stigma.

4—Enlarged front view of top of the column; *a*, the anther.

5—Enlarged side view of top of the column; *a*, the anther; *b*, the stigma or visced surface on which the pollen masses must be placed to ensure fertilization,

6—Enlarged section through top of the column; *a* one of the pollen masses *in situ*; *b*, the stigmatic cavity.

7—Enlarged section through top of the column; *a*, the pollen masses, having been transferred from *a*, Fig. 6, are now represented in contact with the stigmatic surface. [Although diagrammatically shown, these figures give a tolerably good idea of what is actually necessary in order to produce fertilization in a Vanilla flower.]—*Agricultural News.*

TEA, COFFEE, AND OTHER PRODUCTS IN ZANZIBAR.

THE FIRST LB. OF TEA.—COFFEE LEAF DISEASE.—RUBBER AND FIBRE.—CEYLON PINE APPLES.

We have received a copy of the Annual Report (1901) of the Agricultural Department of Zanzibar, and it is interesting to read of the results of the experimental cultivation of various commercial products, most of them only recently introduced into the coun ry. The subjects dealt with in the Report range fromt tea to the minor products, everything grown in Ceyl on flourishing with more or less success in Zanzibar. The cultivation of vanilla seems to be progressing, and the fertilization of the flowers is attended to by native boys who have learned the work. Cocoa and Kola have not made satisfactory progress, the trees having suffered from some blighting influence which attacks the growing points. Coffee, which is also a new product, is now experiencing the leaf disease. The plantation of Liberian Coffee laid in 1899 was growing vigorously and the trees were carrying their first crop. The Arabian Coffee trees, planted in 1900, also had a light crop. Leaf disease (*Hemeleia Vastatrix*) had appeared among the trees, though it had not yet done them any serious harm. The disease is not new to the island, it having been observed on some Liberian Coffee trees at Mbweni in 1898. The Arabian coffee had also been infected by a borer and by an insect which attacked the leaves and spun upon their interior surface a white downy webbing, which curled them up into the form of a big pen at the ends. The tea—raised from seed imported from Ceylon—appears to have been attacked by a pest, while the growth of the plant has proved erratic. We extract a part of the Report which affords interesting reading:—

"We made our first plucking on January 10th, but obtained little more than a pound of made tea. On May 29th we plucked a second time, previous to topping. Growth then remained stagnant till September when light flushes began to appear. By the end of November we were plucking every ten days, and this continued till Januay 16th (1902) when flushes again stopped owing to dry weather. We plucked nine times during 1901 and obtained 46/2 lb. of made tea. During the cool months, when flushes ceased, the trees showed great tendency to run to seed, and we were frequently compelled to send the boys through the garden to pluck off the buds and flowers. The trees have not escaped infection. A blister blight appeared which curled and dried up the leaves. Some specimens were in 1900 sent home to Kew and the authorities there stated that 'The blistering and crumpling of the leaves is caused by a parasite fungus called *Exobasidium vexans*, Massee, which is stated by Watt to have done a large amount of injury to the tea plantations in Assam. It would be interesting to learn how this disease reached Zanzibar. Have the plants been imported from Assam?' Our tea seed came from Ceylon, but it is an Assam-hybrid variety. The attack declined with the survival of growth. At the beginning of 1901 we sent home some more diseased tea leaves which were stated to be infected with 'Gray blight fungus, *Pestalozzia Guepini*, Desm.' But on the whole we can report fair progress with this product."

With regard to rubber, the experimental clearing at Dunga are progressing satisfactorily. Four varieties were cultivated, viz., Para (*Havea Braziliensis*); Ceara, (*Manihot Glaziovii*); Central American (*Castilloa elastica*), and Assam (*Ficus elastica.*) Fibre cultivation was also receiving attention, and the plants in cultivation at Dunga and Mpapa were the American Aloe (*Agave Americana*); Sisal hemp (*A rigida*, var *Sisalana*); Mauritius hemp (*Fourcroya gigantea*); *F. Macrophylla*; *F. Lindeni*; *Sansivieria* sp.; and China grass (*Bohemeria nivea*), all these grew well with the exception of China grass, which barely holds its own. Chillies, cloves and coconuts are next dealt with as also fruit cultivation.

In May last the Department obtained from Ceylon 144 plants of Kew pineapple which had been planted at Dunga and Mpapa. It is hoped in the course of the year to exhibit from these plants pines that will be some improvement upon the native product. Pineapples sell for a pice each in the plantation; the season begins in December. Bananas were thriving and were largely planted for shade; jack fruit was bearing well; arecanut had proved unprofitable; the mango crop had turned out a poor variety; the silk cotton tree (*Eriodendron anfractuosum*) bore satisfactory annual harvest; Cassava cultivation was paying, and sugar-cane was planted to feed the cattle; a few trees of cinnamon and cocaine had maintained a healthy, though leisurely, growth; anatto was growing like a weed; silver oak (*grevillea robusta*) had been set out for shade for vanilla, tea and coffee; *Eucalyptus citrodora*: *E. viminalis*, and *E. teriticornis* were all doing well at Dunga; Bois immortelle (*Erythrinia umbrosa*) grew rapidly, but was one of the few trees subject to scale attack; kus kus grass (*Andropogon muricatus*) was one of the most useful of the minor plants; lemon grass (*A. Schaenanthus*) is also planted, but it dies out after four years. The interesting publication concludes with a report on a labour bureau which had been organized at Dunga.

GUTTA PERCHA FROM A CHINESE TREE.

(*Eucommia ulmoides*, Olive.)

Between 1887 and 1890, from several localities on the middle Yangtze-Kiang river, Dr. A. Henry sent to Kew fruiting specimens of a peculiar Chinese plant, with the statement that its bark is a most valued medicine in China, where it is named "Tu-chung," and that the tree is cultivated for it. "I have never seen it wild," he adds, "but I was informed it occurs so in Fang and other districts to the north." Fang is the name of a reigon near the middle part of the Yangtze-Kiang in the province of Hupeh.

This plant Prof. D. Oliver described (*Hooker's Icones Plantarum*, t. 1950) as *Eucommia ulmoides*.

Flowers not being available, and what material he had so peculiar that its relationships were not obvious, Prof. Oliver left the determination of the order of *Eucommia* open, merely adding that the tribe Phyllantheæ of Euphorbiaceæ occurred to him as of probable affinity.

The interest to us lies not so much in this as in his indication of the presence in the tissues of gutta percba. The discovery he made known in the following words :—

'The most singular feature about the plant is the extraordinary abundance of an elastic gum in all the younger tissues—excepting perhaps the wood proper,—in the bark (in the usual sense of the word), the leaves and petioles, and pericarp; any of these, snapped across, and the parts drawn asunder, exhibit the silvery sheen of innumerable threads of this gum."

His account continues: "The morphological relations and general histology of the cells which give rise to the substance, we hope to have the opportunity of describing from specimens in fluid or living, which, through Dr. Henry's kind offices, there is probability we may soon receive."

When the promised specimens arrived Mr. (now Prof.) F. E. Weiss undertook the examination of them, and from the account of his investigations, published in the Transaction of the Linnean Society (Series 2, Botany, iii., p. 243), the following sentences are drawn :—

"The threads of *Eucommia* consist of caoutchouc, for they are insoluble in alcohol, acids and alkalis, though they become soft when treated with ammonia. They dissolve in chloroform and turpentine, and swell up in ether. When heated they melt, and they burn with the characteristic smell of burning rubber.

From the bark the rubber can very readily be extracted. If the bark be broken in pieces and pounded in a mortar, the mass can be roughly separated into two parts, one consisting of the tangled elastic threads, with small bits of broken bark adhering to them, the other chiefly of bits of bark containing, no doubt, smaller pieces of the threads. From both parts chlorofom will dissolve out caoutchouc, a larger amount naturally from the portion which consists chiefly of the threads. Thus, a sample of the threads and bark weighing 443 mg. gave as much as 25 mg. of caoutchouc, while the remaining bark, weighing 607 mg., yielded only 6 mg. Taking the two quantities together, the yield of caoutchouc was 3 per cent. of the weight of the dry bark, and the same figure was arrived at independently by Prof. F. W. Oliver with another sample. The threads are clear and homogenous, and the only impurity in the chloroform extract seems to be a little resin, which can be washed out with alcohol. Whether the bark can be made use of commercially I must leave to those who are more experienced in technical matters. The distribution of the caoutchouc-containing cells I had been able to determine from the dry material which I first examined, and these observations were confirmed by the examination of the material preserved in alcohol. They occur in the inner portions of the cortex, very much in the position in which the latex cells of *Euphorbia* are found, but are even more frequent in the secondary phloem, where they run between the companion cells, and in both cases present the appearance of very long narrow cells, attaining such a length that one only occasionally finds their ends. In the leaf a group of caoutchouc-containing cells accompanies the ramifying fibro-vascular bundles, running just below the phlœm, while in the petiole and all along the bundle of the midrib they form two groups at the sides of the bundle, and do not run below it. The pericarp of *Eucommia*, which resembles in appearance that of the elmn is especially rich in these caoutchouc-containing cells. Below the epidermis we find a few layers of large chlorophyll-containing cortical cells, which become very much compressed in the dry fruit. Within these are the fibro-vascular bundles, the main trunks running longitudinally, and connected by branching and anastomosing lesser bundles. The longitudinal bundles have a strong group of caoutchouc-containing cells accompanying them on their inner side, and immediately beneath them we find a large mass of circularly running cells of the same nature, forming quite a dense coat of hyphæ-like thin-walled cells, showing their cell-walls very distinctly when the caoutchouc has been dissolved out by chloroform."

These investigations did not settle the position of the genus, and Mr. Weiss left the matter with the remark that perhaps the tribe Crotoneæ might include *Eucommia* in prefereuce to Phyllanthæ of the same order—Euphorbiaceæ.

Since these first researches, made on imperfect material, further knowledge has been due to the success of scientific and horticultural establishments in Paris in obtaining first dried flowering specimens and now living plants. From the museum of the Jardin des Plantes came the material whereby Prof. Oliver was enabled to publish a second figure (*Hooker's Icones plantarum*, t. 2361) and Dr. Solereder's researches (*Berichte der Deutschen botanischen Gesellschaft*, xvii, 1899, p. 387) were made upon flowers sent to him from Paris and fruits supplied from Kew; while the living plants in cultivation at the Jardin Colonial in the garden of the Faculty of Medicine, and by the firm of Vilmorin, Andrieux, & Co., have supplied material for the anatomical investigations of M. Barthelat (*Journal de Botanique*, xiv., 1900, p. 55) and the economic inquiry of MM. Dybowski and Fron (*Comptes Rendus de l' Academie des Sciences, Paris*, cxxix., p. 558).

Examination of the dried flowering specimens which had been received in 1894 from a French missionary —Pere Farges—and were taken from trees cultivated in Szechuen, caused Professors Oliver and Baillon to agree in placing *Eucommia* in the order Trochodendraceæ. Solereder refers it to Hamamelidaceæ. It is impossible to discuss here the cause of this difference of opinion; let it suffice to say that it indicates the difficulty experienced in assigning to its true position this peculiar genus. Wherever from external morphological characters we place it, the allied plants are not rubber-or gutta-yielding plants. Solereder observes this, and compares in justification of his view the Hippocrateaceæ, in which caoutchouc cells are found in certain species.

There are great differences between the caoutchouc cells of *Eucommia* and of the Euphorbiaceæ. In the latter the whole system is one complicated network arising from the branching of cells which are present in the embryo, which grow with the growing plant, ramifying and uniting, so that the outflow of one cut vessel is more than its contents, because other vssels feed it as it bleeds. In *Eucommia* the caoutchouc vessels do not branch and unite, nor are they present, according to Barthelat, in the embryo. Their contents, too, are more of the nature of gutta percha than indiarubber; and in structure they are much more similar to the cells which yield the gutta percha in *Dichopsis* than to the laticiferous vessels of *Hevea*, *Manihot*, *Sapium*, and other Euphorbiaceous plants.

To Weiss' description of the anatomy Barthelat adds somewhat. He found that the cortical parenchyma of the young stem contained abundant caoutchouc cells, sometimes running singly, sometimes two or three together. In the roots he found the same cells in the phloem, and in the petioles both in and below the phloem; while in the leaf-blades they were very plentiful, running with the nerves and branching from them to end in a swollen extremity under the palisade parenchyma of the upper surface.

Caoutchouc is thus seen to be present in every part of the plant except the wood and the outer layer of parenchyma of the young roots.

We may now leave the anatomy of the plant to quote from the paper by MM. Dybowski and Fron of the economic possibilities which *Eucommia* may possess. The following statements are translated from pp. 559-560 of their paper :—

Our attention was called to the similar way in which the contents of the laticiferous vessels of *Palaquium* and *Eucommia* become evident when the

leaves are carefully broken; and so we were led to apply to the different organs of the latter plant the procedure recommended by M. Jungfleisch for extracting gutta-percha from the leaves of the former. We experimented first on some fresh leaves of a plant of *Eucommia* grown in the Jardin Colonial. The leaves are 3 to 3½ inches long and 1½ to 2 inches wide. They are oval, pointed at the end, finely dentate, have short stalks, and in length resemble those of onr common elm. Operating upon 20 grammes of dried leaves, we obtained 0·45 gr. of prodnct soluble in toluene which corresponds to a return of 2·25 gr. per cent. This retnrn is poor, remembering that the fresh leaves contain 70 per cent. of water. The bark is fnll of laticiferous vessels. But the plant which we possess being still very young, we have not been able to take any branches away for examination.

A second series of observations was made upon the fruits. The fruit is a samara, the length of it being 1⅛–1⅜ inches, and the width nearly ½ inch. Two hnndred fruits weigh about 13 to 14 grammes. The extraction of matter soluble in toluene has given us the following results :—

1st attempt, 15 grammes yielded 4·09 gr. soluble in toluene

2nd attempt, 15 grammes yielded 4·12 gr. soluble in toluene.

i.e., 8·20 gr. from 30 grammes of matter, or a yield of 27·34 per cent. We worked with fruits not dried. The fruit contains a small proportion of water, equal to 7·4 per cent.

The product obtained is of a brown colour with metallic reflections on the surface. Plunged into hot water it becomes soft again, stretches out in thin flakes like goldbeater's skin and under pressure will take the impress of metal. In cooling it loses its suppleness and becomes quite hard.

" We have submitted the samples to M. Leaute, an authority on the subject, and he has been so kind as to authorise us to say that he considers the gutta percha of good quality. We have but one plant under observation in the Jardin Colonial, but experiments are being made as to the methods of propagating. As at present *Eucommia ulmoides* is only known to exist in China, it is not easy to get a quantity of seed; and further, germination seems slow and irregular. One sowing produced a single seedling after the lapse of six weeks, a second after five months, and others later. Fortunately cuttings seem to give better results. They will strike root at any season, and give vigorous plants ; but spring, when the branches are still leafless, seems to be the most favourable time for taking them.

Eucommia ulmoides promises to be hardy at Kew. In November 1897, M. Maurice L de de Vilmorin presented a plant to the Royal Botanic Gardens, where it has been grown successfully in the open without protection.

In Paris, where the winters are more severe than at Kew, the plant has survived through them, as testified by the following answer dated November, 18, 1899, kindly sent by M. M. de Vilmorin to a question from Kew:—

" Two plants of *Eucommia ulmoides* remained unprotected against a wall in our Paris garden during the two last mild winters, and stood uninjured through as low a temperature as 18° or 19° F."

The Jardin Colonial has already experiment in hand in Annam, Tonkin, and North Africa.

The bark of *Tu chung* had attracted attention long before the discovery of the tree to which it belonged. The following notice appeared in the Kew Report for 1881, p. 47 :—

Chinese collections of Materia Medica often contain specimens of a drug consisting of blackened fragments of bark and small pieces of twigs. These when broken across are seen to contain an abundance of caoutchouc which can be drawn out in fine elastic threads as in the East African Landolphias. Specimens have reached the Kew Museum from the Paris Exhibition of 1878 (with the Chinese name *Tu chung*), and from the Smithsonian Institution, Washington. The botanical origin has been hitherto altogether uncertain. It seems, however, probable from a notice by M. L. Pierre, Director of the Botanic Gardens, Saigon (*Excursions et Reconnaissances*, No 11, Saigon), that this drug is the produce of *Parameria glandulifera*. This is an apocynaceous climber, ascending to the summits of the highest trees; it is common in the forests of Cochin China. Specimens which M. Pierre has obligingly communicated to Kew prove that the plant is identical with a species which abounds in Southern India. M. Pierre states that " the sap which flows from the stem has exactly the appearance of milk, and may even be used as a substitute for it; and it has a slight nutty flavour. In the liquid state it is often employed in medicine by the Annamites and the Cambodians. The bark, after being dried ordinarily in smoke, is sold at 20 to 25 francs the picul=133⅓ lbs.), and exported to China. The bark is a medicinal product esteemed by the Chinese."

The real source of the drug was cleared up when the specimen of *Eucommia*, collected in Hupeh in 1887 by Dr. A. Henry, was described in 1890 by Prof. Oliver in the *Icones Plantarum*. Dr. Henry's specimens were accompanied by the following note :—

The *Tu chung* tree 20-30 feet. The bark of this tree is a most valued medicine with the Chinese, selling at 4s to 8s a lb.

Mons. Pierre concurred that the suggested identification with *Parmeria* must be abandoned.

Subsequently further specimens were received from the Museum d'Historie Naturelle, Paris. These had been collected in Szechuen in 1874 by Rev. Père Farges. They were accompanied by the following note :—

Lorsqu'on brise l'écorce les vaisseaux cortieaux s'etirent comme des fils de soies ; c'est pour cela qu'il est appele aussi vulgairement *se mien.* Ecorce officinale usitée dans les maladies des reins et comme une charpie dans les blessures.

Eucommia is a tree of mountainous districts. The name *Tu chung* is, however, applied by the Chinese to a tree of the plains, which is almost certainly a *Euonymus* and not improbably *E. hamiltonianus*, Wall. (See *Kew Bulletin*, 1899, p. 219 .

RUBBER CULTURE IN NICARAGUA.

The following report on the cultivation of rubber on the old Mosquito Coast by Mr. Gordon Waldron is interesting because of the conflicting opinions of those interested with regard to the possibility of successful and profitable growing rubber in this district.

Before 1898 there had been no rubber planting beyond a few fruitless experiments on the Atlantic coast of Nicaragua. In 1898, the work began on what may be called a large scale, and each year since the number of planters has increased. It is safe to say that in this vicinity about £10,000 in gold value is now being expended yearly in growing rubber exclusively.

PLANTING.

The method of planting followed here by all who have achieved any success has been to grow rubber entirely without shade. The best practice is to fell the primeval forest early in the dry season, viz., during March and April – to lop the branches and brush closely, and, when the whole has become dry enough, to fire it, with the result that everything is burnt but the trunks and large branches. Stakes are then set out at regular intervals over the burnt field. From the 1st or 15th of May to the 15th of June, the land is planted by setting a rubber seed to each stake, or, if seed is plentiful, two seeds, so that if one fails there may still be a tree. Where two plants come up at a stake, one is removed, and the other is left to grow permanently.

There has not been uniformity of practice as to the distance between stakes or trees. Some have planted as far as 20 feet apart, while others advocate 5 or 6 feet, the trees to be tinned ont by excessive bleeding when they may be found too close together to grow fast. Opinion seems to be fixing on 10 feet as the best distance for a permanent plantation. Land measure here is in manzanas of 100 varas square*—that is to say, an area of 10,000 yards or 320 square yards more than 2 acres. The number of trees, therefore, which may be planted 10 feet apart each way on a manzana is 900. No further attempt is made at logging or clearing away the remains of the forest. Decay is extremely rapid. The laud is not plowed or cultivated in any way, except by repeatedly cutting down the weeds and vegetation, so as to allow the foliage of the young rubber to be completely exposed to the agency of the sun.

The trees planted in 1898 are now three years old, and their growth has been enormous. A large number of trees grown from the seed planted in June, 1898, measured in August, 1900, on an average, 17½ inches in circumference. A few of these trees measured in July, 1901, shew an increased diameter of from 1 to 2¼ inches. All the trees here spoken of are probably above the average of the whole. As to the average size of all the trees of the same age on a large area, it is enough to say that where there has been no difference of soil or attention, they have a regular and even appearence. A few planters believe that trees carefully grown and cared for will be large enough to bleed safely and profitably at five years of age. At all events, it is now established that the rubber trees can be grown to a large size in a few years.

It still remains for experience to prove the yield of the cultivated tree. That the bark of the tree is full of milk from the time it is capped by half a dozen leaves is beyond question, and why it should not yield as well as the wild tree, neither science nor ingenuity can suggest. A few months, or a year at most will settle the question in this locality.

As to cost, opinions naturally differ. It may be asserted safely that a careful planter, working a large area, may bring his trees to five years for 50 cents each, taking account of land, administration, labour, buildings, and equipment. The chief difficulty in the way of the foreigner planting rubber in this country is likely to be his inability to realize the need and cost of cleaning. This inability may lose him his first year's outlay. He may also stumble in trying to do too much. All the first planters suffered heavy loss, because they were unable to find seed, for love or money, to plant the land they had prepared. The young cultivated trees are now seed bearing, and in this locality there is now, in this respect to trouble.

In 1898, £200,000 would not have availed to plant successfully 200 acres. Minor troubles (which may become major, if one's, temper be not serene) are the labour question and the deposition to leisure, which affects all natives.

WARNING TO INTENDING RUBBER PLANTERS.

Sane and modest planting enterprises promise well but a weather eyes should be kept on stock jobbers, who have out prospectuses for the development of large tracts of forest land, on which wild rubber trees of great value are said to be growing.

This warning is based only on knowledge of this coast, and it is not pretended to make it apply beyond, though it would not be bad judgement to conclude that similar conditions prevail all over Central America.

The bleeding of rubber began here in 1855. From the mountains to the Atlantic there existed vast numbers of rubber trees. A man could go out in the morning and come back at night with 100 lb. of rubber. The wealth and commerce of the coast was built up on rubber; but the rubber tree was practically destroyed by the ignorant and greedy hulero. Comparatively speaking, but a few scattered trees survive. These are hidden in the depths of an almost impassable forest. However valuable they might be, if accessible, neither skill nor money could make them an important asset of a rubber company.

To prepare the land upon which they grow for rubber planting and save these trees is practically impossible The trees are pretty sure to be torn down by the felling of others, or burned in the clearing fire. It may be added, in support of this estimate of wild trees, that the huleros, or rubber cutters, preferred to work in the camps of the rubber planters for about £2 4s. per month than to seek vast wealth in the forest —*India-Rubber and Gutta-Percha Trades' Journal.*

CARDAMOM CULTIVATION IN COORG.

A correspondent writes to the *Madras Mail*:—The familiar cardamom of commerce is the produce of a plant which is botanically known at *Elettaria Cardamomum*, and is indigenous to the hilly parts of Cochin China, Travancore, Malabar, Coorg, Munjerabad and Nugur. It grows abundantly, both wild and under cultivation, in the moist shady mountain forests of North Canara, Coorg, and Wynaad, at an elevation of from 2 580 to 5,000 feet above sea level. It is found truly wild in Canara, and in the Anamalli, Cochin and Travancore forests. On the lower range of the Pulney hills, near Dindigul, at an elevation of 5,000 feet above the sea, it is systematically cultivated in the shade. There is also a small Cardamom Island in the Laccadive group of atolls. The plant grows as a spontaneous seedling in woods of high land, the cultivation consisting merely of clearing the ground from trees. Fructification occurs in the fourth year as a rule, after which the plant produces fruit for five or six years. A rich moist soil in a bracing hill climate, within reach of sea breezes and favoured by deep shade and partial sunshine, is most congenial to the plant, while it attains perfection in a light layer of vegetable mould, resting on decayed primary rock. In the vicinity of streams and in localities subject to mists and fogs it also thrives remarkably well.

Its cultivation by the natives of Coorg presents several interesting features. The people firmly believe that the plant will only grow in places where the ground has been shaken and opened up by the fall of large trees. In February or March, the cultivators proceed to the forest and map out the boundaries of gardens. Having selected some large trees for felling, all the undergrowth near them is promptly cleared away. A platform is erected near the foot of the tree selected to be cut down. All this has to be accomplished in a day. The following morning the felling begins, and is completed by noon—for to prolong the work further is considered unlucky. Several gardens are thus prepared, with spaces of jungle between each of them. Within three months of the felling, or during the first monsoon rains, the young plants shoot up on all sides, chiefly round the stems of the fallen trees. By the second year they are two feet high. Now regular weeding operations are carried out. Each plant is allowed six feet of clear ground around it, the weaklings being removed. Early in the third year long shoots bearing the cardamom pods shoot forth from the ground. They are marked with beautiful pale white solitary flowers. The fruit is an ovate triangular three-celled three-valved capsule of a dirty yellow colour, enclosing numerous angular seeds, which form the valuable part of the plant, and which, if bruised, yield a pungent aromatic taste.

By September or October of the third year, the capsules ripen, and the first crop is gathered, a portion of it being offered to the deity. The next year a full harvest is collected, and then the plants go on yielding for about six or seven years. After this, they begin to weaken down, when large trees are again felled so

as to fall across the sickly plants. Young plants then spring up, while fresh stems shoot out from the roots of the old ones, and the new comers bear fruit in due course, dying down after five or six years, to be again succeeded by another generation produced by the process above described. The hill cultivators have their own superstitious notions, of course, but it is not difficult to explain rationally the good effects of the process of felling. The removal of the large trees admits a certain amount of sunlight; their heavy fall loosens the soil and opens it up to the action of the air. The cutting down of the undergrowth, which decays and dies where it drops, helps to fertilise the soil and to prevent its nutritive properties from being exhausted. The crushing of the plants at intervals of six or seven years by means of further felling merely serves to give them much-needed rest, after which they come up again, rejuvenated and vigorous.

Harvesting operations begin in September or October, and they present a really picturesque scene, though it is undoubtedly hard work for the harvesters, who have to put up with many discomforts and be prepared any moment for unpropitious showers of rain. They build little huts in the jungle, and in the centre of the floor a large pit is dug, about three feet deep, that will hold about eight or ten maunds of cardamoms. The sides of the pit are covered with leaves, and a circle of stones is arranged round the top to prevent dirt from falling in. At early dawn, one group of harvesters sets out to clear the gardens of weeds and undergrowth, and a little later, a second group follows. These pluck the clusters of cardamoms by hand, breaking off the racemes very close to the stems and dropping them into baskets made of leaves. At sunset, all return, bearing their precious loads. At night, after a simple meal, the capsules are picked from the branches and thrown into the pit—a task which is sometimes carried on late into the night. After a little sleep, the men rise betimes and proceed to the gardens, and the whole programme is repeated until the harvest has been fully collected.

Meanwhile, the women come from the villages to the huts, and measuring the cardamoms into bags, carry them to the drying ground. They are best dried by exposure to the sun, being spread out for the purpose on large mats, and taken in at night. Four days' good sun dries them properly, but too much exposure would result in the bursting of the capsules. After being dried, they assume a yellowish white colour. If rains comes down, the drying is effected by means of the smoke of wood fires, but by this process the cardamoms turn a darkish colour, which reduces their value. The last process, before the dried capsules are packed in close baskets and made ready for market, consists in removing the fruit stalks and all impurities. Precautions are also taken to keep dry and green capsules apart; besides which, different qualities of capsules are carefully separated, those having the largest number of fruit bearing racemes on one stem fetching the best price and being technically known as "full crop."

The Coorgs have several superstitions regarding the cultivation of cardamoms. The felling of the big trees must be completed by noon, for it is deemed unlucky to fell in the afternoon. Tuesday and Friday are considered very auspicious days for beginning cultivation, whereas Sunday is always avoided as unlucky. The presence of certain plants, such as ebony, dammer, wild nutmeg and wild pepper, near the felled trees, is looked upon as a sure sign that the site cleared for new gardens is favourable for a rich crop. To ascertain this, a few big trees are sometimes felled one year and the following year, the presence or absence of the lucky trees just named is looked for, and only if they are found is the site used for a garden.

Cardamoms serve a great variety of purposes, and possess, therefore, considerable commercial value. In commerce, several varieties are distinguished according to their size and flavour. The most esteemed are known as "shorts," being from a quarter to half an inch long and about a quarter broad. Following those come "short longs" and "long longs," also distinguished by their size, the largest reaching about an inch in length. The "shorts" are more coarsely ribbed and of a brown colour. They are commercially called Malabar cardamoms or Wynaad cardamoms and reckoned the best of the tree. The "long longs" are more finely ribbed and of a paler colour, the seeds being white and shrivelled. The "short longs" differ from the latter only in being shorter or less pointed. Large cardamoms, distinct from these, are furnished by a different species of *amomum*.

In Travancore, where the cardamom grows spontaneously in the hills, in the deep shade of the forest, the cultivation has hitherto been almost entirely in native hands. The cultivators early in the season go up from the low country, cut the brushwood, burn the creepers and otherwise clear the soil for the growth of the plants as soon as the rains fall. The rainy months are terribly malarious, so the cultivators hurry back, to return at crop time. Till a few years ago, cardamoms were State monopoly, but this system has been almost totally abolished and a system of land-tax introduced instead, with considerable profit to the Sirkar. In Coorg and Wynaad also, the industry is almost entirely in native hands, though the cultivators can always obtain remunerative prices from planters and European merchants. On the Anjer Kandy Settlement, near Tellichery, there are fine gardens, which yield very satisfactory returns.

The cardamom is not very largely used in English cookery, but in Northern Europe it is extensively consumed, being much in requisition for flavouring pastry. In India it is greatly prized, and is an article of almost daily use, being substituted for tobacco as well as for betel and pan, as well as partaken of in conjunction with these articles. The capsules are used by natives in flavouring sweetmeats and certain cooked dishes, while, when tender, they are pickled. The use of the spice both as a medicine and a luxury has gone up steadily, so that cardamom cultivation, systematically conducted, would be a suitable industry especially for native capitalists and planters. The cost of cultivation does not amount to much, while by the adoption of improved methods, such as timely transplantation, trenching, manuring and irrigation, quantity and quality of crop could both be substantially improved. The plant easily repays care bestowed upon it, almost the only necessary conditions being that it should be raised on congenial soil and harvested and cured with due regard to the needs of buyers and consumers.—*Indian Agriculturist*

VALUE OF WOOD ASHES.—The three valuable fertilising elements found in wood ashes are potash, phosphoric acid, and lime. The value of a sample of wood ashes was formerly measured by the amount of potash it contained, but now that the value of lime is more generally recognised, that element is considered. The value of any sample of ash will depend on the wood which was burned to produce it, and on the way it was burned. If exposed to the weather heavy rains will leach out some of the potash. It is probably safe to assume that the average ton of wood ashes kept under cover contains 5 per cent. of potash, $1\frac{1}{2}$ per cent. of phosphoric acid, and 33 per cent. of lime. The phosphoric acid in ashes is insoluble, but the potash and the lime are both in good form for plant feeding. Wood ashes have a mechanical effect on soils. They bind the lighter sandy loams more closely together, thus making them better able to hold water. The lime acts beneficially on clay soils by pulversing them. The potash lye from the ashes, in solution, has power to dissolve organic matter, and thus making nitrogen in the soil available. Wherever wood is burned on the land very rank growth is sure to follow. This is not all due to the potash left in the ashes from the burning, but because that potash helped to make the nitrogen in the soil available for plant food.—*Journal of the Department of Agricualture of Western Australia.*

AIRBORNE TYPHOID.

BY LIEUT.-COLONEL R.H. QUILL, R.A.M.C.,
[LATE] SENIOR MEDICAL OFFICER, CEYLON.

At the late meeting of our Association, Dr Leigh Canney read a very interesting paper on the Etiology of Typhoid Fever, in which, while strenuously supporting the proposition that epidemics of typhoid fever are always waterborne, he vigorously denounced those who ventured to believe that such epidemics could sometimes be traced to an airborne origin. I should like to say, at the outset of the remarks I have to offer on Dr Canney's proposition, that I, in common, as I believe, with the officers of the R A M C, as a body, hold that epidemics of typhoid fever are chiefly waterborne, and it is to the water supply we first turn our attention, when investigating the origin of typhoid cases, occurring sporadically or epidemically. But I am entirely at issue with Dr Canney when he lays down the hard-and-fast proposition that typhoid epidemics are invariably waterborne—never airborne. The subject is one of far-reaching importance, well deserving of full discussion. I will therefore, as briefly as possible, adduce evidence to prove that the wateroorne theory will not *always* account for the occurrence of a typhoid epidemic. My facts will be drawn from our experience in connexion with the large camp in this Island where Boer prisoners of war are confined. In August, 1900, a large camp was formed at

DIYATALAWA,

in the hills of Ceylon, for the Boer prisoners of war. The first batch of prisoners arrived on August 9th, and succeeding batches quickly followed, until by the end of December 96 officers and some 5,000 men were under confinement. On September 21st, 1900, one of the prisoners who had arrived on September 5th reported sick. He was found to be suffering from typhoid fever of probably ten or more days' duration. This was the commencement of an epidemic of typhoid among the prisoners, which soon assumed formidable proportions. By the end of December 600 cases had been diagnosed as typhoid fever, and during the same period some 200 cases of simple continued fever occurred, many of which, it is highly probable, were mild cases of typhoid. We fully satisfied ourselves that this epidemic of typhoid among the prisoners had been imported from South Africa, but in that connexion I refrain from further remarks, as it has nothing to do with the proposition I have set myself to prove. It is here necessary for my argument that I should briefly describe the relationship which exists between the prisoners' camp and that of the surrounding camp, where is located the military guard. The prisoners' camp, situated on an undulating slope, is surrounded with a strong fence of barbed wire; outside that fence are inner and military guard lines. The "inner guard" consists of a number of sentry boxes at intervals of 100 yards, and placed only some 20 yards from the barbed-wire fence. The "outer guard" consists of guard huts occupied by strong guards, placed on rising ground some 200 yards further back. The latrines, urinals, washhouses, and hospitals for the prisoners are all situated close to the barbed-wire fence which surrounds the prisoners' camp as a whole. The guard for the prisoners was formed by the 2nd Battalion, King's Royal Rifles, who were a fine healthy body of men. No suspicious fever of any kind, prior to the outbreak among the prisoners, existed among them. The battalion remained in a thoroughly satisfactory healthy condition until October 18th, 1900—that is, for over two months after its arrival at Diyatalawa, and for a month after the first case of typhoid occurred among the prisoners

On October 18th a man reported sick; he was found to be suffering from fever, which quickly proved to be typhoid. From that date admissions for typhoid among the battalion occurred at short intervals, until by the end of December there had been altogether 24 admissions and 5 deaths. Now in attempting

TO ACCOUNT FOR THIS OUTBREAK OF TYPHOID FEVER AMONG THE MILITARY GUARD

at Diyatalawa Camp I commence by advancing the following evidence against the outbreak having been in any sense waterborne:—

1. The water supply was obtained from a mountain stream some three miles distant, and was brought into camp by underground iron pipes. The intake in the hills was so isolated that its pollution was, indeed, very remote. On the arrival in camp of the main iron pipes, smaller ones passed directly into four large Pasteur tank filters disposed about the camp in suitable positions, while in each barrack hut portable Pasteur or Berkefeld filters were placed and kept under careful supervision; thus all water used in the camp before its distribution invariably passed through a thoroughly reliable filtering medium. The water prior to filtration was subjected to a weekly chemical analysis, and the report always gave the water a high character; a similar verdict followed frequent bacteriologicol examinations, There has been no alteration in the water supply or filtering arrangements since the camp was opened, and no case of typhoid fever has occurred among the troops since December, 1900—that is, since the practical cessation of the epidemic among the prisoners of war.

2. No fresh milk was allowed within the camp precincts. When milk was required condensed milk (Milkmaid Brand) was used.

3. All aerated waters used in camp came from the Ceylon Brewery at Nuwara Eliya, and were identical with those used at that sanatorium. There has been no enteric fever at Nuwara Eliya.

4. No uncooked food or uncooked vegetables were used in camp.

5. No native hawkers of any kind were allowed to enter the camp.

6. Within the camp there were five or six native shops; these were under strict military supervision. No native drinks of any kind were sold in them. The aerated waters sold in them were invariably procured from the Ceylon Brewery at Nuwara Eliya.

7. All men leaving the camp for purposes of duty or pleasure were obliged to take with them a water bottle filled with filtered water.

8. It is to be remembered that for obvious military reasons the camp was situated in an isolated position in the hills, far removed from habitations of any kind.

As the foregoing considerations, in my judgment, completely put out of c ourt a waterborne cause as being responsible for the typhoid outbreak in the military camp, I was driven to the conclusion that the infection was airborne, being derived from the adjoining prisoners-of-war camp, where at the time an epidemic of typhoid fever was raging. In support of that opinion I submit the following observations:

1. Guard huts, accommodating strong guards, surround the prisoners' lines, and are close to them. This for military reasons is unavoidable.

2. The men on sentry duty are during day and night posted at short intervals almost immediately outside the barbed wire enclosure which separates he prisoners from the military camp. Thus those on sentry duty (a numerous body of men) are in close contact not only with the prisoners, but with their latrines, urinals, and washhouses, all of which, as I have already stated, are situated close to the barbed-wire fence. The undesirability on health grounds of the line of sentries being placed so close to the prisoners' camp was fully recognised, but for military reasons it was not found possibleto alter the arrangement. From the foregoing remarks it will be obvious that those on duty in the guard huts and sentry boxes must be to a very appreciable extent exposed to the emanations arising from the latrines used by the prisoners of war, especially during the time when the latrines are emptied—a frequent necessity. Now assuming that such emanations contained typhoid organisms—not a very far-fetched hypothesis when we remember that at the time typhoid fever was very rife in the prisoners' camp, and further assuming that typhoid infection can be airborne—the possibility, nay the probability of the infection being thus conveyed from the prisoners' camp to the military guards appears to be well-founded.

3. But in addition to the assumption that the emanations from the prisoners' latrines may have conveyed infection to the military guard, it has to be recorded that the soil of the prisoners' camp gave peculiar facilities for the spread of the infection. The rank grass which originally covered the slope upon which the previous camp was arranged very soon disappeared, giving place to a reddish soil, so friable that dust was much in evidence, notwithstanding that it was the rainy season of the year. Now it is not unreasonable to reject as pure the dust of a camp in which at the time a formidable epidemic of typhoid fever was prevailing.

4. Lastly, the possibility of the infection being conveyed to some extent by flies must be considered. During the whole period that typhoid fever was prevailing in the prisoners' camp, flies in that camp amounted almost to a plague, the military camp being also infested, but to a lesser extent. Now flies being well adapted for the carriage ot infection it is plain that, under the conditions existing in the prisoners' camp, there would be nothing to prevent flies laden with typhoid bacilli migrating from the prisoners' to the military camp, and thereby conveying to the latter camp the poison they carried.

I have endeavoured in this paper to review dispassionately the evidence bearing on the causation of the typhoid outbreak which occurred among the military guard at Diyatalawa Camp, Ceylon, during the closing month of 1900. I submit that I have shown—

(*a*) That all water avenues through which typhoid fever could have been conveyed to the military camp at Diyatalawa, were efficiently guarded, and therefore that a waterborne origin must be abandoned.

(*b*) That the infection was airborne, resulting from emanations from specifically infected latrines, infected dust, or bacilli-laden flies.—*British Medical Journal,* Feb. 15.

ENGLISH MERCHANTS IN THE FRENCH CONGO.

RUBBER AND OTHER PRODTCTS.

(*To the Editor of the "Times."*)

Sir,—I have read with considerable surprise a paragraph in your issue of May 29 setting forth a communication from the French Colonial Minister relative to the position of the English merchants in the French Congo. I propose to deal briefly with this communication and to refer to the character and gravity of the conflicts of private interests, without misrepresentation or exaggeration.

It is quite true that the litigation has been between private firms ; but this has arisen entirely from the action of the French Government in granting concessions to certain new companies in Paris, to the detriment of the old firms who have been established and trading in the colony for over 40 years. In my own case my experience extends over a longer period, and my firm has paid many thousands of pounds to the French colonial authorities for duties, patents, &c. The greatest cordiality existed between the Government and the merchants until the granting of these concessions. The trading was also uniformly carried on, without litigation or trouble, and, I venture to assert, to the benefit of the colony and the natives of the country.

To those unacquainted with the nature of the trade it may be interesting to state that the produce of the soil, indiarubber, palm oil, palm kernels, ebony, and the ivory tusks of the wild elephants, comprise what the native has to give in exchange for cotton manufactured goods and other imports. The commercial intercourse of the *Hinterland* is by a system of barter between what the native has to offer and the Europeans to give in exchange.

The French Government by the granting of these concessions has handed over large tracts of country to certain companies, who claim the produce of the soil which the native innocently believed belonged to him and which he is now prevented offering to the English firms, though most anxious to do so. The freedom of trade to which reference has been made used to exist, but does so no longer. It cannot be called " freely carrying on their business" to be shut up in a factory, on a piece of land about 100 yards square, and not allowed to buy any produce from the natives ; yet that is the position these concessions have placed us in today. The monopolists have closed the trading routes against us, seized our produce, and by the course of litigation, already referred to, obtained damages against us, presumably for trespass and illegal trading. Some of these trading centres are in the conceded area, and the situation of others is uncertain, because, so far as I know, no complete boundaries have been defined, except on paper. In proof of the uncertainty to which I refer, I may instance a dispute which arose not long ago between two of the concessionaire companies, also a case in March last, when a seizure of a quantity of indiarubber was made from one of our traders at M'Beka. I do not know the exact position of this place, and although I have made inquiry, have not succeeded in getting the information, but am informed that there is a doubt as to which concession it belongs to. What the English firms complain of is that, having traded in the country so many years, before the advent of the French authorities in the *Hinterland*, subsequently under French rule by licenses

granted and paid for, and having invested labour and capital, they consider they have acquired certain invested interests which are now being taken from them without any consideration whatever. What the English firms say is, if you are determined to drive us out of the country, pay us for our factories and goods, also a fair sum for disturbance, and we are ready to leave the colony. We have endeavoured to do our duty as good colonists. Let the French Minister for the colonies inquire from the natives of the Ogowé and N'Gomie, far and wide, what they think of Hatton and Cookson, and then let the Minister realise that in relinquishing our position we are saying good-bye to very old and faithful adherents among the native population with sincere regret. I am, Sir, yours faithfully,

EDWARD H. COOKSON,

Managing Director, Hatton and Cookson Limited. Liverpool.—London *Times*, June 16.

PLANTING IN B. C. AFRICA.

(*From our Correspondent.*)

Mlanje, British Central Africa, June 24.

I have been up for a change to our mountain sanatorium, and had to run from it owing to the cold. My house is at 6,800 ft. elevation. The thermometer registered 44 deg. at 6 a.m., 60 deg. at noon, and 50 deg. at 6 p.m. during the week I was there. How does that temperature compare with Nuwara Eliya?

COFFEE CULTIVATION IN BRITISH CENTRAL AFRICA

is not proving the successful enterprise that was anticipated some years ago. Much land was planted with coffee (like scrub or chena lands in Ceylon) which only gave a crop and pegged out. Even on good forest clearing with or without shade crops it cannot be depended on to come up to estimates owing to various causes, principally insect pests, thripps, bug, &c. &c. Labour is abundant now. The hut tax has been raised to 6s. I am turning away people daily who come for work, and I have none to give them, as I am as clean as a new pin, tea cut down, and coffee crop finished and despatched. Many planters, who have given up coffee, have gone to transport and trading work. Others are going in for tobacco planting which should yield them a good profit. I have got some 30 acres in cultivation this year. A very good market for tobacco is found in S Rhodesia, and if we get into the South African Customs Union there ought to be an unlimited market for us, which at present, is practically shut, owing to the protective duty. Food and labour are becoming cheaper instead of dearer. I know one man who paid his last gang of people off with Calico at the rate of 1s 6d for men, 1s for women and 6d for children, per month, last week. I am paying 2s for men, 1s 6d for women, and 1s for children.

OUR RAILWAY

seems as far off as ever, no start made yet. I hear that, owing to the war (which, thank, goodness, is now concluded) the whole amount of capital was not subscribed, and that the Government would not allow Messrs. Sharrers' Zambesi Traffic Company to begin work till all the capital was secured. Mr Stephen Robins, who was on Laelumza, the Nyassland Company estate, has secured a billet in the B C A administration and has gone to Fort Johnston, coffee ventures not having proved an Eldorado to him,—H. B.

P.S.—I enclose some photos. I regret my plates were spoiled with the damp during the rainy season. So no good results to show.—H. B.

TEA CULTIVATION IN NATAL.

Reuter's correspondent in Natal, who, we believe, is Mr Charles H Lepper, formerly a tea planter in India, in describing the industries of the colony, devotes some space to tea. He says: "The more important tea estates are situated on the north coast in the vicinity of Stanger, a small village in the warmest corner of Natal, not very far from the mouth of the Tugela River, dividing Natal from the Province of Zululand. The estates are a few miles inland from Stanger, and have been connected with that place by a narrow gauge (24 inch) steam tramway, eight miles in length, by the enterprise of the local managing director of the most important of the tea companies. The two leading companies hold adjoining estates, the larger known as Kearsney, and the other belonging to Messrs W R Hindson and Co.; Limited, proprietors of four gardens forming one property. The Kearsney is considerably the larger of the two, and has about 1,750 acres under tea of all ages. The 'jat' upon this estate is a good strong Assam hybrid. The output of 1901 was close upon one million pounds. The soil is friable, sandy in places, and of the red loam class in others. The bushes in parts of the estate are very well grown and equal to those one sees in Assam and Cachar, and considerably better than the average in Dehra Dhun. The vacancies are chiefly upon old sites of Kaffir huts, upon which tea cannot be got to grow, owing to the excess of potash in the soil. The bushes come into bearing in their fourth year, and are expected to yield in that year 400lb to the acre, or under favourable circumstances 500lb. When in full bearing, in the fifth year, the average yield is about 600lb, and in a good season reaches an average of 700lb. To bring an acre into its fourth year is estimated to cost £30, but there are considerable risks; as after seedlings have come on well during the first portion of their growth, should a hot wind come it will sometimes kill off every seedling of that season's planting, in spite of any shelter which can be provided. Happily the labour employed is almost exclusively that of Indian coolies, imported under 'indentures' for five years. The class of coolies imported into Natal, chiefly from Madras, the rest from Bengal and the North-West Provinces, is not to be compared, either in physique or in character, with those employed in Assam or Cachar. Like all the coolies imported into Natal, they are of a very inferior type, and most of them would not be able to earn their living upon an Assam estate. I also visited W R Hindson & Co.'s estates. These, the second in importance in Natal, possess an aggregate of about 800 acres under tea of all ages. The output in 1901 was given me as 400,000 lb, and this year it is hoped that it will be increased by 50 per cent. The wholesale prices obtained by Natal tea estates upon the South African market run from 7½d per lb for the lowest (very coarse) quality called 'extra fine Souchong' in metallic paper packets, or 7d per lb in boxes of 14 lb and upwards, up to 1s 6½d per lb for the highest quality (Orange Pekoe) in 1 lb packets, or 1s 6d in boxes. A half-penny per lb extra is charged if purchases are of less aggregate weight than 600 lb."—*H and C Mail*, July 4th.

PLANTING NOTES FROM THE SEYCHELLES.

Specially written for the "Ceylon Observer.)

Seychelles, July 10.

MR. R. W. SMITH OF THE CEYLON P. W. D.

arrived here about a month ago from Ceylon *via* Mauritius. Why he was sent this round-about way, when there are direct steamers every eight

weeks between Colombo and Seychelles, is a secret known only to those who rule in your part of the world. He was accompanied by Mrs. Smith, a Sinhalese clerk and several coolies. After a day or two, arranging matters with our Administrator, the party went over in the Government cutter "Wave" to Félicité Island. Mr. Smith had left Ceylon under the impression that Félicité had only its name to recommend it and that he and his party would have a pretty rough time of it when they got there. However, being well supplied with tents and camping gear, they hoped to get along somehow. They were considerably and rather agreeably surprised on reaching Félicité to find a nice little stone bungalow, newly whitewashed and painted, awaiting them. The coolies were lodged in the island hospital where they also soon made themselves thoroughly at home.

FELICITE

is an island of about 700 acres. It is Government property, but leased on a long term to Messrs. Baty, Bergne and Co. of Victoria. This firm are the principal holders of islands in this part of the world, they being lessees of the Aldabra and Cosmoledo and most of the Admiranté Archipelagoes. Félicité is a veiy mountainous island and planted partly in

VANILLA AND COCONUTS.

It produces at present about 50,000 nuts a month, but will soon produce considcrably more when the younger plantations of coconut trees come into bearing. A large quantity of vanilla was planted on Félicité some years ago, but for some unknown reason it has never done well there.

This is not the first time that Félicité has been used as a

PLACE OF DETENTION FOR POLITICAL OFFENDERS.

The ex-Rajah of Perak (Strait Settlements) was confined at Félicité for nearly two years before he was allowed to reside at Mahé. In the good old days, before the French occupation, Félicité seems to have been a rendezvous for pirates. At the north end of the island there are several old walls and other signs of a former occupation. Several Spanish coins of about 1650-1700 have been from time to time picked up in the neighbourhood and this gives colour to the belief that it was a pirate haunt. *Quién sabè*?

Mr. Smith was naturally very interested in seeing our

SEYCHELLES METHODS OF WORKING COCONUTS

and comparing them with what is customary in Ceylon. To begin with, nuts are never picked off the trees. In fact, if even a labourer were caught doing so he would be severely punished. Coconuts here are largely converted into oil, and we believe that the longer a nut is ripening the larger the oil cells in the copra. Here nothing is done with the coconut husks, no coir is manufactured. Mr. Smith was also very interested in our methods of drying copra. All over the Seychelles we have what is known as *secheries* (drying houses). These are of two kinds, either fixed trays and sliding roofs or sliding trays and fixed roofs. The sliding trays or roofs are on wheels so that one or two people employed about the headquarters of an oil estate can protect in a few moments many tons of drying copra from a sudden shower of rain.

THE EXPORTS OF GUANO

from Seychelles are steadily increasing. The barque "Cape Raçe" sailed a few days ago with 1,000 tons for Falmouth for orders. A large Norwegian barque is loading a cargo for Antwerp, and the Colonial three-masted schooner "Ebenezer" is about to load 800 tons for Port Louis, Mauritius. Our Seychelles guano is a dark brown impalpable powder, something like cocoa, but without any smell. It is poor—very poor—in all manurial qualities except phosphates. It is not worth much in itself but a splendid stuff with which to mix other manures.

VANILLA PLANTING AND CULTIVTION.

The following memorandum has been issued from the Government House, Seychelles :—

MEMORANDUM.

No vanilla plantation should be started in Seychelles with a capital of less than £1,000, seeing that it takes three years to bring in a crop. Land suitable for vanilla, cacao, coffee and other tropical products cannot be secured for much under R300 per acre, and even at this price, it is not easily obtainable. The ordinary rate of interest in Seychelles is twelve per cent per annum. The local currency is the Rupee, the value of which may be taken as 1s. 4d. Under the old system (planting on bars, wires, etc.) from 1900 to 1300 vines were planted per acre. Vanilla is now planted on live trees, and the number of vines planted depends upon the number of trees existting on the land brought under cultivation. Cuttings of quick-growing shrubs are now often planted in vacant spots, and vines are grown thereon in the absence of trees, and within three months of the planting of the cuttings. Vines are planted 6 in. long, and began to bear three years after planting, but will only come into full bearing in three years more. Vines are worth per 100 from R3 to R5 according to district. Wages: men R14 to R16, and women R8 to R12 a month, without rations. On hill estates labourers are not easy to get, and most of the Africans prefer working on the share system. A man can plant 350 cuttings or vines per day, and can keep in good order, throughout the year, 2,500 plants. Women are employed for marrying the flowers *i. e.* removing the pollen from the anther of the flower and applying it to the stigma (fertilisation), without which operation the flower is lost. A woman can marry from 600 to 800 flowers per day. No flowers can be married after midday. Each vine can produce from 25 to 30 pods of different sizes, from 4 in. to 8 in. long. On an average 130 green pods go to 1 lb. of dry prepared vanilla. Pods shrink considerably in preparation, losing a quarter of their weight. Local prices: last year (1901) fine pods prepared fetched R6 to R10 per lb. Green pods are now being sold at R3 to R5 per hundred pods. The regular flowering season is from August to December. The cost of preparation varies from R1 to R1·25 per pound. The pods are gathered about nine months after the flowers have been married, and curing the pods takes from three to four months. In Seychelles, as elsewhere, there are bad seasons (too much rain), in which case the yield is poor. The climate of Seychelles is very healthy. The population on the 31st May, 1901, was 19,257. The death rate in 1901 was 18·77 per 1,000. The Seychelles are in direct steam communication with Aden and Mauritius by a monthly service of steamers of the Messageries Maritimes Company, and with Colombo and Mombassa by a bi-monthly service of steamers of the Imperial German East Africa Co. Steamers belonging to the British India Company call, from time to time, at Seychelles. The Eastern Telegraph Company has a station at Victoria.

The rainfall in 1901 in Victoria was 101·83 inches. The maximum shade temperature registered was 88·5, and the minimum 68·4; the mean for the year being 78·50.

Total revenue for 1901	...	R486,323·98
,, Expenditure for 1901	..	401,821·57
,, Surplus for 1901	...	R84,502·41
Declared Value of Exports, 1901	...	R1,417,515·19
,, ,, Imports, ,,	..	R1,149,646·21

Hotels.—Only one, small and uncomfortable.

No cyclones.

Principal merchants: Affoi & Co.; Boustead, Sons & Co.; Baty, Bergne & Co.; D' Emmerez & Co.; E. Lanier & Co., Said & Co.; L Deltel, Son & Co.; P. Marvanji & Co.; Temooljee & Co.; K C Chetty & Co.; and K S K Naiken & Co.

TEA BOXES:—VENESTA, LIMITED.

(Extracts from Proceedings at Fourth Annual General Meeting.)

It requires many tons or millions of feet of Venesta boards to amount to the total turnover of last year, namely £54,500, as well as a great deal of hard work in the manufacture, disposal, and shipment of the goods. Perhaps I may here point out that this turnover has been created on an available working capital of about £3,000—which may possibly convey to you some idea of the care and close attention that has been necessary in the management of the business. I am glad to be able to add that the six months now closing show further proportionate increases, and unless any unforseen circumstance arise the totals for 1902, both in export and home trade, should show a larger turnover than in any previous year. The export department has been affected by the general conditions of the tea industry. Several of our buyers of tea chests held over rather large stocks of chests from 1900, and the restrictions in the picking of teas reduced the quantity of chests required for the season. As you will see by the report, our total shipment of tea chests for the year 1901 was 296,000 while for this year in this first six months I am glad to tell you we have sold 258,000 tea chests, and expect by the close of the year to finish with sales of about 350,000. Mr Penny, who has recently returned from Ceylon and Australia, has, as might be expected by his energy and ability, done good service for the company, and cleared up some important points of difficulty, and while visiting several of the tea gardens has brought the advantages of our tea chests practically before the managers and growers, from which good results may be looked for. I regret to have to tell you that the lead mill, which ought to have been completed last June, did not get to work until November, and then not successfully, and therefore did not contribute to the profits of the year. The reason for this was that our consulting engineer made some errors in his design of the mill, and consequently alterations have had to be made in the machinery, which has caused considerable delay in completing the plant, together with some loss of profit. You will, however, be pleased to hear that these difficulties have been overcome and that the mill is now in good working order and capable of turning out all the lead we require for all our trade. The working of this lead mill and the convenience we experience by being able to ship all the necessary parts and fittings of our tea chests from our own factory will greatly facilitate the working and contribute to the profits of the business. We have now a staff of experienced work-people (about 100), who have acquired an expert knowlege of how to put our boxes, cases, and fittings together, and we are also fortunate in possessing an efficient foreman of each department, all of whom are controlled by our able and excellent works manager, Mr Whitt, who has always shown considerable interest and intelligence in the performance of his duties. The Russian business has shown further increase in the department of furniture, seating, hat boxes, &c. The works at Reval, which occupy a space of about thirteen acres, part of 54¼ acres owned by the company, and employ about 1,500 hands, are well maintained, and consist of some of the most modern machinery suitable for the purposes of the business, worked by electricity of about 900 to 1,000 h.-p. The factory specially erected for the manufacture of Venesta boards is capable of producing about 30,000,000 ft a year.—*Home and Colonial Mail*, July 4.

TREE-GROWING AT A HIGH ELEVATION IN CEYLON:

THE BEST-WOODED PLANTATION IN THE ISLAND:

ABBOTSFORD REVISITED.

We suppose we may, without presumption, speak of the Tea and Cinchona plantation identified with the name of the late Mr. A. M. Ferguson—and with that of his son, the present proprietor,—as, without exception, "the best-wooded" private estate in the island. The late proprietor took a special delight in getting seed and plants of trees likely to grow in the soil and at the elevation of Abbotsford from every quarter he could hear of in India, Australia, Java, the Straits and England or Scotland. There were, of course, many failures; but also many successes in his introductions and for the last six years of his life he had the great advantage of the counsel and aid of the present Manager of the Estate who knew a great deal about Forestry before ever he came to Ceylon. The result is that, so far as the introduction and cultivation of a great variety of Australian Eucalypts and Acacias, Javanese "Albizzias," Himalayan Toons, Birches and other trees, Japanese and English Firs, with pines and oaks; and a considerable variety besides,—Abbotsford presents an "experimental plantation" in Upper Dimbula, comparable —*longo intervallo*— to even the "Hakgala Gardens" on the other side of the range facing Uva. Indeed the experienced and enthusiastic Superintendent of Hakgala was, some time ago, astonished and delighted to see the conjunction in Lower Abbotsford of so many palms—Australian *Coryphas* and even *Caryota* flourishing: difficult if not impossible to grow in his colder climate—along with English, Himalayan and Japanese introductions. One of the finest English oaks we have seen in the island is here—a tree of, perhaps, 25 feet high; but, curiously enough, it practically stopped growing six years ago and does not now make an inch a year in growth. An oak and a palm, within a few yards of each, form an interesting conjunction. We have not seen the Gangaroowa "Albizzias"—which are realising R15 each, no doubt greatly because of their proximity to the Kandy timber market—but it would be hard, we think, to beat the trees of this description on Abbots-

ford, some of them 17 to 18 years old and great giants. *Auracarias* here and there diversify the outlook. One of the most strikingly handsome trees, scattered over the plantation, is the Himalayan Birch-tree (*Betula Acuminata*)* which, though not tested yet, must offer a very substantial timber, perhaps too hard to work by the carpenter (in a land where bobbins are not in request)—but at any rate invaluable for rough building work on an estate and for firewood if the necessity should arise.*

EUCALYPTS.

Along the roadside, too, there are some magnificent trees of *Eucalyptus pauciflora*; while there is one specimen of the attractive *E. Ficifolia* (rare in Ceylon) with its peculiar scarlet blossom; while higher up we noted grand specimens of *E. Calophylla.* Very striking also is the giant Eucalypt—*E Amygdalina* or white gum—to which species in Australia belong the highest trees in the world. Here they grow to, perhaps, 100 feet; and the contrast is interesting between the red (*E Rostrata*), and the other two gums growing alongside:—

THE RED, WHITE AND BLUE!

Of blue gum (*globulus*) not many trees remain; for the reason that they have chiefly supplied firewood for the Factory tea driers (power is got from the river fortunately) during the past ten years, so that there has been no trenching on the forest reserve.† A curious discovery about the blue gum was that, while flourishing apace on the lower division up to 5,500 feet, it did not grow at all well on Upper Abbotsford—although strangely enough there are magnificent trees in and around Nuwara Eliya still higher up. The late Mr. Ferguson and his Manager were so convinced as to the comparative failure of this tree that they gave special warning to the Government Forest Officers not to waste time and money by trying plantations of it in the adjacent jungle clearings; but their advice was not heeded, with the result that today the five-acre clearings planted with blue gums in the jungle by the old road to Nuwara Eliya are poor affairs—and stand as exhibitions of stunted failures. The blue gum tree serves well for factory (fuel) purposes save that the exuded gum is apt to fix on the flues and in the case of steam-engine boiler flues, especially, to choke up the channels. Even in a domestic stove, the flue has been found blocked up after a time and has required hammer and chisel to cut out the adhering gum which had become almost as solidly fixed as if it were part of the iron!

One of the most attractive of the Eucalypts is *E. citriodora* (the lemon-scented gum tree, from the pleasant odour of the crushed leaves or broken stems). Several fine specimens (as indeed of all the Eucalypts) are to be seen at Hakgala, and with us at Nuwara Eliya; but we hear that the finest show of the lemon scented, perhaps, on a private estate, is found at Mr Gordon's bungalow on Rappahannock, Udapusellawa Altogether there must be over a score of different Eucalypts—many of them strikingly handsome trees—in the plantation; but curiously enough there is no specimen of *E Pilularis* which attracted attention some time ago on Carlabeck, for its size and good timber. —It is curious to notice the resemblance and the difference between the barks of three prominent Eucalypts—Jarrah (*E. Marginata*) Red gum (*Rostrata*) and Iron Bark (*E. Crebra*) —all doing well as growing trees.

Some of the Grevilleas here vie in size with the other large trees mentioned, and they and the "toons" (*Cedrela toona* of the Himalayas) are freely scattered over the property. But the former (the "silky oak" of Queensland) may be taken to have reached the limit of successful cultivation if regard be had to its full growth as a timber tree, on the neighbouring estates—Maha Eliya and Calsay—and again on Tangakelle, Ouvahkelle and Elgin which present a wonderful sight in the uniform and numerous interesting belts of grevilleas, where we can recall the wide expanse of cultivation being without a tree some years ago. Perhaps *E. Robusta*—which has become a favourite in these parts as at Nuwara Eliya—is a quicker grower than the Grevillea; while it also supplies a substantial timber. A grove of these between Abbotsford and Tangakelle shows very regular and successful growth; but the striking fact here is the way in which self-sown cinchonas have sprung up among the gums, groups of fine healthy plants showing how well shade agrees with the far-famed Peruvian

---

* We only identified the tree on our return to Colombo and from what is said by Dr. Watt in his "Economic Products," it will be seen that we are a little wide of the mark as to the value of the timber:—

"Betula acuminata, Wall; Brandis, For. Fl., 458; Gamble. Man. Timb., 372. Habitat.—A large tree, met with in the Himalaya, from 6,000 to 8,000 feet, in the Khasia Hills, the mountains of Manipur and the Naga Hills to Martaban.

"*Properties and Uses*:—Fibre.—The bark when mature peels off in larger slabs than in any of the other species, and is therefore not so serviceable for the purposes to which the others are put.

"Food.—On the mountain tracts of North-East Manipur, bordering on the Naga Hills, the Lahupas cut off the bark in large slabs just before the leaves appear. The inner layer of these slabs is carefully separated from the liber and sun-dried. This is either eaten like biscuits, or it is reduced to flour and cooked as an article of food. The tree is much prized by these naked savages, and in early spring yields a considerable portion of their diet. This remarkable fact does not appear to have been observed by any traveller, previous to my exploration in 1880 of the hill tracts of Manipur, and apparently the nutritious properties of the bark have not been discovered by other Indian hill tribes. (See remarks under B. alba.)

"Structure of the Wood.—White, moderately hard, close-grained. Weight 41 lb. per cubic foot.

"It is very little used, but Wallich says it is hard and esteemed in Nepal for all purposes where strength and durability are required. "The wood is close-grained and takes a fine satin polish. It is particularly good for door panels, and the examples in the Government House at Naini Tal show that it is a valuable acquisition for ornamental work." (Atkinson's Him. Dist. X., N.-W.-P. Gaz., 818.)"

† This is as true in regard to timber, planking, &c., as for fuel—all the timber required for buildings, lines, &c., has been got for many years by cutting and sawing introduced trees without touching original reserves and we fancy the Abbotsford Manager could more than confirm the useful figures sent for publication lately by Mr. Maclure of Maskeliya.

introduction. Had cinchona originally been grown under shade in Ceylon, we might even now rival Java in our exports.

A SPECIAL FAVOURITE.

But we must not forget to notice what is, in our experience, the best timber tree to grow in and around Nuwara Eliya and perhaps (judging by the specimens here) lower down, namely *Acacia Melanoxylon*. It is really a valuable cabinet wood, when fully grown ; and we recall the late Rev. W. Oakley, the veteran Church Missionary, showing us with pride a book-case and other cabinet-work he had made out of some Melanoxylon trees, having all the markings and dark colouring of Nadoon or Walnut. No straighter or more handsome tree in our opinion grows about Nuwara Eliya, nor one which better resists monsoon bursts and wind-storms, apt to level or break the tops off, a good many gums and other trees. On Abbotsford, and especially on adjacent Dessford, there is a large number of the finest specimens (for growth) we have seen of Melanoxylon : but, alas for the exigencies of the situation—as well as because of distance from market and absence of demand—a good many are being levelled and cut up for fuel purposes. It is a fact, however, that this tree, like most of the Acacias, is not a favorite with tea planters, because of its tendency to spread and throw up suckers, especially where the soil is stirred for cultivation purposes. On a piece of land reserved for timber trees this propensity does not so much matter: in fact it constitutes an economical means of planting up waste bits of land in or near the Sanatarium, where the tree flourishes apace, and in its lofty as well as symmetrical, pyramidal shape, it offers an attractive feature as an avenue tree, or in groups at certain vantage points.

ORNAMENTAL AND FRUIT TREES.

A very attractive-looking tree in its youthful prime—seed got from Java—is *Acrocarpus grandis* ; as also *Swietenia macrophylla*, Mahogany plants from Peradeniya; but of slow growth up here ; while Dr. Thwaites' favourite *Pehimbiya* (Sinhalese name of *Filicium decipiens* which he used to recommend to planters is not much more than a shrub at an elevation which not only sees certain palms but a fine *jak-tree* come to fruit ; as also mango-trees in full bearing !

Of "Cupressus," and "Cryptomeria " there are many fine specimens on Abbotsford—though Hakgalla Gardens are the true show-place for giant trees in great variety of these. A tree which is encouraged as a good and handsome grower, especially suited as a windbelt, is the Himalayan *Bucklandia*, splendid specimens of which in huge well-formed trees (80 feet high or so), we observed on our way to Darjeeling from the *terai* upwards. It is very much used at Darjeeling for planking and for doors and windows.

BAMBOOS.

A feature on Abbotsford—and one which could be turned to mercantile account if a town like Colombo were near at hand—is the numerous groups of bamboos, of the giant variety especially, along the riverside and in many of the ravines, varied with the tiny (and medium) varieties useful for basket making. The present Manager had to clear out a great many clumps of bamboos from ravines as not so useful as water or Mauritius grass.

CINCHONAS.

Revisiting Abbotsford after an interval of two or three years, one of the most pleasant sights was the number of healthy, vigorous-looking cinchona stems rising above and diversifying the tea fields, chiefly Succirubra and Hybrid. The smoother velvety leaves in some cases denote an approach to the more delicate and richer varieties. Altogether there must be quite 100,000 of these healthy stems from the old roots and from self-sown plants; while one of the original plants left to grow by the roadside, which was measured in our presence, is 72 feet high by 36 inches in girth at a foot above the ground. The age of this giant is 19 years.

CINCHONA PLANTING NORTH OF KANDY.

I am planting some cinchona : seedlings from old Ledger. I don't find that they make much progress in old soil—sides of drains and roads—but on new land they do come away. I have been planting for fuel and it is between the lines I put the Cinchona, and I hope it will give back the outlay and leave the trees free.—*Planter.*

PLANTING NOTES.

CAPACITY OF CISTERNS.—When calculating the capacity of cisterns (or tanks) 31½ gallons are estimated to one barrel and 63 gallons to one hogshead.

A CIRCULAR CISTERN ONE FOOT IN DEPTH.

Five feet diameter holds		...	122½	galls.
Six	do	..	176½	do
Seven	do	...	240½	do
Eight	do	..	314	do
Nine	do	...	397½	do
Ten	do	...	490½	do

A gallon of water weighs 10 lb, and measures 277·274 cubic inches ; a cubic foot of water contains 6·23 gallons, and weighs 62·35 lb ; 1 cwt of water contains 11·2 gallons, and measures 1·8 cubic feet ; 1 ton of water contains 224 gallons, and measures 35·9 cubic feet.—*Home paper.*

YARN FROM PEAT FIBRE.—The honour of inventing the first successful process to utilise peat fibre in the textile industry cannot be claimed by the German inventor whose achievements in this direction were recently recorded. A London wool merchant writes to say that a home industry is the pioneer in the industrial application of this new fibre, the various products of which are already on the market. "The finer yarns composed of peat fibre mixed with wool, which appear to be the dream of the German inventor, have not only been successfully produced, but the hosiery made therefrom is already manufactured by a leading Leicester firm. Further than this, yarns have been made fine enough for the manufacture of flannel equal in texture to the finest French cashmeres, and also cloths for athletic costumes, &c.

Cacao Preparation.—Is it because each Manager thinks he knows best and has some secret of his own, that there is so little interchange of opinions in regard to this product? In any case we are glad to have one planter breaking "the conspiracy of silence"—if such it be—although, possibly, all that is of much practical value is given already in Mr. Hart's useful little Manual?

Fish Culture (the Mahseer) and the Rainbow Trout.—We direct the attention of all interested to an interesting letter and other remarks on the above subject to be found in our daily and *T.A.* We suppose the hardy and ubiquitous "rainbow" trout will flourish right along in the Mahaweliganga, almost from its source to its several mouths near to, and South of Trincomalee.

Sequoia Gigantea Pendula.—There exists in the pinetum at Bicton a specimen of this Conifer, 33 feet in height, the bole girthing 26 inches at 2 feet from the ground. A tree of this variety may not be out of place in a collection of Conifers, but as an isolated specimen it is, in my opinion, not a beautiful object. The plant was put into commerce in 1871, so that it is highly probable taller specimens are to be found in this country than the one alluded to above. J. Mayne Bicton.—*Gardeners' Chronicle*, July 12.

Tea Cultivation in India.—Some interesting figures published last month by Mr. O'Conor, Director-General of Statistics for India, will be found on page 174. The most important fact relates to the area of tea planted since 1898. For that year it is given at 31,561; 1899 is put at 13,978 acres; 1900 at 6,829 and 1901 at 2,234—or a total in four years of 54,602 acres. Ceylon compares much more favourably, thus:—1898=14,000 acres; 1899=6,000; 1900=3,000; 1901=500 (?); or a total of 23,000 acres; while 6,000 to 8,000 acres have been abandoned in 1900-2. The total capital of the joint stock Companies engaged in Indian tea is close on R160,000,000.—Some curious information regarding "extensions" in India are given elsewhere.

Rainbow Trout—are thus referred to by 'J. B." in his 5-page paper on Angling in the Supplementary New Volume of the "Encyclopædia Britannica:"—

Rainbow trout (*Salmo iridens*) have now been so largely introduced into England that they certainly claim attention. As regards their beauty, sport-giving and edible qualities they rival the sea-trout, while they grow with astonishing rapidity when well furnished with food. They are easily reared, and are certainly a great acquisition. They have not yet had time to become acquainted with the methods of English fly-fishers, and rise freely at any fly and take all the ordinary trout baits. They succeed particularly well in lochs and other enclosed sheets of water. They appear to have migratory tendencies, but it has not yet been definitely ascertained whether this migration is simply in search of food from streams and rivers where they find themselves starved, or whether it is an instinct. A quantity which were placed in the Dove have, to the knowledge of the writer, remained there three years. They have disappeared from many streams.

Rubber Cultivation.—The full and interesting information supplied by Major Reeves in a recent issue, respecting the culture of Castilloa Rubber is exciting much interest, to judge by enquiries made to us. Unfortunately, there is none of the seed of this valuable Rubber tree available locally for sale. We hear of a good deal more land being planted with this Rubber in Matale

Composition of Arrowroot.—The *Journal of the Chemical Society* for May records the following analysis of arrowroot rhizomes from Jamaica:—

Water	63·42	per cent.
Starch	27·84	"
Dextrin and Sugar ...	2·68	"
Crude fibre	3·94	"
Ether extract ..	0·19	"
Proteid	1·64	"
Ash	0·89	"

The ash consists chiefly of phosphoric acid and potassium carbonate. The pulped root, when steam distilled, yields a volatile oil.—*Agricultural News*, July 21.

The Tea Production of Japan.—In regard to the production of tea, another of the principal resources of Japan, the prospect is no brighter, as far as the foreigner is concerned. "There would be trouble about wages, strikes and disturbances and the foreigner would be generally shown that he was not wanted." What is required to increase the market value of the tea is the introduction of improved machinery for its manufacture, but the lack of capital, together with the indifference and indolence of the people, do not give much hope that this step will be taken. The melancholy conclusion, from a Western commercial point of view is, that "whatever value as a national resource the production of tea in Japan has, ... for better or worse it must remain in the hands of the Japanese, to be developed at their own gait, and that it offers no inducement for the investment of foreign capital.' *N.C. Herald*, June 18.

Green Tea in Ceylon and where it is Made.—We are obliged to Mr. Deane for his explanation elsewhere. There is, it is true a very large area of low to medium elevation tea, which gets no better prices than the dead lowcountry estates, about 70,000 acres in all, and it is the former which, for a time at least, would make green teas by preference. Higher-grown estates would scarcely go on making greens, if the market for finer qualities and flavours hardened considerably and the better demand for them assumed some permanence. At the present moment practically all lowcountry estates could manufacture green teas—say, a total outturn of 30,000,000 lbs. with the prospect of better results than by the manufacture of blacks, provided such general action on the part of proprietors did not swamp the green tea market. The 10,000,000 lbs. limit, put by Mr. Drummond Deane on Ceylon lowcountry greens, is much too low. The question is largely one of supply and demand. If 20 million pounds of Ceylon greens are manufactured, prices of blacks may be expected to advance to such a point as to make it desirable to resume the manufacture of black teas.

THE ÆTIOLOGY OF TYPHOID FEVER.

Dr. Thomas Cherry, Lecturer on Bacteriology in the University of Melbourne, gave an address on the Ætiology of Typhoid before the sixth session of the Inter-colonial Medical Congress of Australasia, held in Hobart last February, in the course of which he observed that the study of the bacteriology of typhoid was rendered difficult from the fact that the disease was not readily transmissible to any of the lower animals. The bacillus coli communis and the typhoid bacillus had so many points in common that they produced similar reactions, and were to be regarded as members of the same group of bacteria. One of the marked characteristics of the group was the extent to which variation took place amongst the descendants of a single bacterial cell. Although there were several tests by which typical typhoid and colon bacilli might be distinguished from one another, the gap between the two was completely bridged over by a series of intermediate forms, amongst which was the B. enteriditis, or Gaertner's bacillus. Many cases were on record which went to show the long periods of time that typhoid bacilli could exist without causing symptoms. All recent work tended to show that many mild cases of fever, often classed as febricula, were really typhoid, and might be an unsuspected means of spreading the disease. The direct evidence as to the mode of entry of the infection into the body was scanty. From a recent analysis by Schüder of 650 epidemics, occurring chiefly in Germany and England, it appeared that 462 epidemics were due to water, 110 to milk, 23 to other food stuffs, 12 to clothing or bedding, and 43 to other causes. Dr. Cherry stated that, whilst there could be no question as to the origin of the great majority of epidemics of the disease, there was often difficulty in accounting for isolated cases. Some of these were so peculiar that it must either be assumed that the bacillus could exist in a virulent form in water or soil for several years, or else that the colon organism in the intestine became transformed into typhoid, or, at all events, into the intermediate form, and thus the disease arose *de novo*, as Murchison taught. Several such difficult cases were quoted and discussed. The actual mode of conveyance of the bacilli to the patient might be by means of minute particles of fœcal matter containing great numbers of bacilli which might get into water, or be carried on the feet of the flies on to articles of food, or be carried about in the dust. Dr. Cherry's general conclusions were as follows: (1) Many mild cases of fever, often classed as febricula, were slight attacks of typhoid, and might serve to distribute the contagion; (2) typhoid fever itself might be a composite disease, or series of diseases, caused by closely-allied organisms; (3) while from the bacteriological evidence the *de-novo* origin of the disease was not disproved, still a general survey of all the known facts enabled most cases to be explained without having recourse to this hypothesis; (4) typhoid fever at once disappeared from a community with the introduction of a proper system of disposal of excrement and household refuse; in towns this could best be done by a properly-constructed water-carriage system of sewage; (5) the disease was spread chiefly by the contamination of water, milk, and other articles of food; in hot countries, at least, flies and dust had a considerable share in bringing about this contamination; (6) the length of time during which the bacilli could exist outside the body was unknown; there was evidence to show that the contagion hung about old cesspits and contaminated soil for several years.—*British Medical Journal*, May 17.

RUBIES AND GOLD.

Sir Lepel H. Griffin presided at the meeting of the Burma Ruby Mines, Limited, on June 14. He said the directors had hoped to have been able to pay something on the founders' shares, and to provide for the commencement of a reserve fund, which was exceedingly desirable, as no mining operations could be conducted with full security without a reserve fund; but they had not seen their way to do so. It might seem from the dividend proposed that they had had a very prosperous year. From one point of view that was no doubt the case, and they had at last reached the point—which he had prophesied for two years—of washing over 1,000,000 trucks of ruby earth during the year. On the other hand, it had not been a satisfactory year from many considerations. As business men the shareholders would be aware of the difficulties which industrial institutions of all kinds had met with during the past two years. India had passed through, and was still passing through, a time of great distress and anxiety. It had suffered very largely from plague, famine, and the influences of the war. The consequence had been, and this was the reason why they were not declaring a dividend on the founders' shares, that the local trade in rubies had almost entirely ceased. There were large stocks in hand which, if they had all been sold, would have enabled the company to pay a dividend of 20 per cent. But they remained on hand, and no doubt as matters improved, with the wearisome war at an end, and with things looking more flourishing in India, the company might hope to share in the prosperity which he could foresee and prophesy for all English industrial institutions. The company had not been successful with regard to its experiments in plumbago mining. They had not spent very much on it, and having taken expert advice, had decided that as they were a ruby-mining company principally, they would stop working for plumbago. There was plenty of plumbago, but it was not of that flake character which was of the highest value, and amorphous plumbago at present prices would hardly pay to extract and export. Perhaps in the future, when they had more leisure and more money, they might try again in other places, and perhaps get better results. They were making some experiments without much expense in the matter of gold mining. There was a good deal of gold in Burma, and though he did not wish to raise any hopes, he could say that the experiments they had made were satisfactory. It was thought necessary before any great expense was incurred to get a new lease from the Government, as their lease had only a few years to run. Application had been made for a new lease for 30 years, and, bearing in mind the attitude of the Governor-General in favouring English companies, they had every reason to anticipate that their application would be successful Until that was settled they must delay any large and extensive works. In conclusion he had to tell the meeting that they had received a telegram from the manager stating that the returns from the new mine at Ohoungzone were now very satisfactory, and that the returns were very much improving. Mr Carl Meyer seconded the resolution for the adoption of the report, which was carried unanimously.—*Overland Mail*, July 4.

FISH CULTURE IN CEYLON.

We call the attention of the Ceylon Fishing Club Committee to the following important letter addressed to the Editor of the

London *Spectator*—and especially to the reference made to "the rainbow trout" which s expected to flourish in nearly all our Ceylon streams:—

"SIR,—In the *Spectator* of June 14th you draw attention most usefully to the vast uncultivated waste of water, both fresh and salt, in these islands. In Germany today there is hardly a pool, however insignificant, but is stocked with the fish suited to it. The Government popularises fish culture by exhibitions of hatcheries in the Zoological Gardens at Dresden, Frankfort and elsewhere, and also by public lectures. At Wittengau, in Bohemia, Prince Schwartzenberg is said to spend annually a quarter of a million florins on food for his carp ponds. In the German system the carp pond is dried every third year, and the residual fertilisers result in an immense yield of vegetables. In the United States the Department of Fisheries conveyed both the shade and the striped bass from the Atlantic to the waters of the Pacific. The Report of the Department for 1896 (p. 141) states that "the aggregate expense of introducing these fish to the Pacific Coast was under 5,000 dollars; the market value to the fishermen of the Pacific Coast of these fish taken between 1888 and 1896 was about 192,000 dollars." When in Washington this year I called with a friend upon Professor Smith at the Department of Fisheries, and he informed us that it cost the Department at their Pacific nurseries a dollar per thousand to "strip," hatch, and rear for six months young salmon; that at Clackamas, on the Columbia, they had marked five thousand "fingerlings" by shaving off the adipose dorsal fin with a razor; that the third and fourth year after four hundred and twenty-five of these marked smelts had returned from the ocean and had been captured of an aggregate weight of over ten thousand pounds. I am glad you draw attention to that splendid visitor from California, the rainbow trout; there is no fish so easy to rear, so rapid in growth, and so adaptable. The rainbow, unlike any other of the *Salmonidae*, thrives in lakes and ponds where the summer temperature rises to even eighty degrees.—I am, Sir, &c., MORETON FREWEN.

25, Chesham Place, S. W."

We have been asked as to the climates of California and Florida: they are both on the whole semi-tropical, the mean temperature of San Francisco being 56°; but California extends over a vast range of latitude. In Florida, again, freezing-point is sometimes touched in winter, though in summer it is quite hot. Curiously enough in the account of both States in the *Encyclopædia* there is no mention of the "rainbow trout," though many other fish in California are mentioned.

In connection with local Fish culture, we may quote what a military officer formerly in Ceylon has to say, writing from Northern India on 10th July:—

"Kumaon is a lovely district and Bhim Tal is in the middle of the lakes. There are three lakes within a few miles of each other—Bhim Tal, Nankuchia Tal and Sath Tal. All are pretty, but Nankuchia is my favourite. It is quite like Loch Lomond near Luss. Sath Tal is lovely too, but has not the breadth or feeling of freedom there is about Nankuchia. The hills (all fir-clad) rise abruptly from the water round Sath Tal which nestles in their shadow. The waters of all the lakes are clear as crystal and they are full of Mahseer which take the fly or baste freely. I caught over 200 lb. of fish while I was there, biggest 3¼ lb.—1 lb., 1½ lb. and 2 lb. fish are very common and give excellent sport. I am not sure, if it would not have paid better, from a fisherman's point of view, to stock the Nuwara Eliya waters with Mahseer instead of trout; they are quite as sporting a fish and much easier to establish properly. The lake at Nuwara Eliya would have suited them perfectly."

PRODUCTION OF TEA IN INDIA.

AREA.—The area under tea at the end of 1901 extended over 524,767 acres, nearly two-thirds (65·4 per cent) being in the valleys of the Brahmaputra and Surma, which contain as much as 338,186 acres, namely, 205,352 in Assam (the Brahmaputra valley) and 132,834 in Cachar and Sylhet (the Surma valley). In Bengal the area under tea is 135,129 acres, or 25·7 per cent of the whole.

The number of acres added to the tea-growing area each year since 1897 has been:—

1897 ...	36,838	1900 ..	6,829
1898 ..	31,561	1901 ..	2,284
1899 ..	13,975		

Under the discouragement of the low prices obtained for tea placed on the markets in excess of consuming capacity, endeavours have been made to restrict cultivation and production, and to supply the consumer with tea of better quality in smaller quantity. The nett addition to the tea area made in the last two years was comparatively small, considerable areas on which tea cannot be grown with profit at the present range of prices having been abandoned.

In Assam reports were received from 805 estates, with an area under tea of 338,186 acres, the average area of an estate being about 420 acres. In Bengal 300 acres was the average for 452 estates, and in Travancore the average for 75 estates was 357 acres. In other localities the average area of an estate is much smaller: 137 acres in Madras, 110 acres in the United Provinces, and only about three acres in the Panjab, where natives grow tea in a very small way. These figures refer only to tea-bearing areas.

PRODUCTION.—The quantity of tea produced has increased in about double the ratio of increase in the area under cultivation; for, while the area has increased since 1885 by 85 per cent, the increase in production has been 167 per cent. Last year the restriction of the area under tea was accompanied by endeavours to reduce the quantity of leaf taken from the plant and improve the quality. These endeavours were aided by climatic influences, and there was a material restriction in the quantity produced.

The actual production in 1901 is reported to have been about 191¼ million pounds, which is 57 per cent larger than the reported production of 122 million pounds ten years previously, in 1892.

On the average of the last five years, the yield to the acre, dividing the total yield by the area of the land bearing mature plants, has been as follows in Assam and Bengal:—

	lb.
Assam—	
Brahmaputra Valley ..	383
Surma Valley ..	478
Bengal—	
Duars ...	488
Darjeeling ...	278

CAPITAL EMPLOYED.—According to the published accounts, the paid-up capital of the joint-stock companies engaged in the production of tea approximates to sixteen crores (R15,82,44,000), namely—

	R.
Companies registered in India	2,01,69,000
" " London £9,205,000=	13,80,75,000

Thus between 87 and 88 per cent of the capital belongs to shareholders in companies whose head offices are in London.

Divided into the area actually under tea this capital stands at about R300 (£20) per acre. There is a further unknown sum engaged in the industry, representing the capital of individual owners, while on the other hand, the acreage includes areas worked by such private owners, including natives. On the whole, however, making allowances on both sides of the account, probably the capital value per acre stated above is not very far wrong.

PERSONS EMPLOYED.—The number of persons employed in the industry in 1901 is returned at 606,835 (permanently) and 90,946 (temporarily) or altogether a little more than two-thirds of a million (697,781 persons), which would work out to about 1·33 persons to the acre.

EXPORTS AND CONSUMPTION.—The tea produced in India is exported, mainly to the United Kingdom, to the extent of nearly 97 per cent of the average production. The subjoined figures give approximately the quantity of tea consumed in India, the figures representing the average of the last five years :—

		lb.
INDIAN TEA	Produced ...	176,349,300
	Exported ...	170,790,208
	Left in India ...	5,559,092
FOREIGN FEA	Imported ...	4,961,607
	Re-exported ...	1,898,271
	Left in India ...	3,063,336

Thus more than eight and a half million pounds were left in India on the average, 5½ millions Indian and three millions foreign, the bulk of the foreign tea being Chinese, though a substantial quantity consists of Ceylon tea.

1895 ...	97	1899 ...	58
1896 ...	84	1900 ...	64
1897 ...	64	1901 ...	45
1898 ..	61	1902 ...	22

The production of tea in India and Ceylon has increased so much more rapidly than the consumption in the United Kingdom, which is the principal market for these teas, that there has been a heavy fall in price and the tea industry in 1901 passed through a critical period, but prospects at present are much less gloomy. The restriction of output to which reference has been made, and the reduction of the quantity exported, had the effect of elevating prices to some extent last season from the low level to which they fell in the preceding season.

J. E. O'CONOR, Director-General of Statistics.

INDIAN TEA.

DIFFICULTIES WITH LABOUR AND EXTENSIONS:

MODERATE ESTIMATES AND LARGELY INCREASED CROPS!

Some curious facts came out at the General Meeting in London of the Makum (Assam) Tea Company the other day. The Chairman stated (*inter alia*) :—

It is almost impossible now to get coolies, except when they are recruited by our own Sirdars, and the difficulty of recruiting labour has been found of late so very serious that a large company, the Assam Frontier Company, have just purchased an old tea Company in the recruiting districts in order to have a basis —in order to have a recruiting depot in the midst of recruiting districts. They have bought this company not to make tea, but simply to make coolies.

Mr. Thompson stated :—

There seems to have been £2,457 spent on the North Bank garden, and out of it we have only got something like £1,000 worth of tea under the present condition of affairs. I should therefore, think it would be wise on the part of the directors to abandon the North Bank garden to stick to the Margherita ground A great deal of worry in the tea market is, not that there is not enough tea produced, but that there is a jolly sight too much produced. Therefor, if we produced more, it would make matters worse than they are.

But Mr. Densham (Mazawatte Company) thought otherwise :—

Growing, as we do, some of the finest tea that comes into the country, and whilst I am as strong as anybody—I spoke at a meeting yesterday on the same subject—for the abandonment of land that does not pay, yet our company is so very heavily capitalised—I might almost say grossly over-capitalised—that we are absolutely dependent upon extensions for making dividends. Inasmuch as we are growing some of the finest tea that comes into the country, I think it would be a most woful mistake to abandon a beautiful virgin soil like that. His (Mr Thompson's) remarks would be most forcible if applied to some other companies, but to my mind here they are not in keeping with the facts. I should say let us go on planting out tea every year; it is our only chance of getting dividends; it is money sunk in the business. Over in the North Bank garden it is all young tea, and we cannot match Makum tea, we want as much Makum tea as we can get into the country.

Mr. Seton :—The Chairman has indicated to us that the main reason why we are not succeding now is the great difficulty of getting labour; and yet, Gentlemen, although that is a patent fact, we are going on opening another garden, for which we have of course, still less labour, and are consequently deprived of a sufficient amount of labour for our Margherita estate.

I would remind Mr Densham that he is not taking account of the large amount of tea put in cultivation, the enormous additions of area which have been made comparatively recently. I should like to know whether you have decided at the present moment to stop making further extensions.

The CHAIRMAN :—Absolutely. It is quite settled. You may be easy in your mind about that.

Mr SETON :—Of course, the North Bank is too small to pay as a separate garden. That throws us back on the fact that we have got 400 or 500 acres only, and I am repeatedly told by people who have gardens in Assam that it is practically impossible to make 400 or 500 acres pay.

The Chairman regretted the small outcome from the garden, and said he anticipated it would increase. I hope it won't, for if it does we shall be in a still worse position than we are in now. I will give you some idea of why I say so. In the course of my business I have to examine nearly all the Companies' reports; and I have not taken up any report in the past year in which the directors do not hope, anticipate, and estimate a larger crop for the next year. If their predictions are realised we shall probably see ten or twenty million pounds more tea. . . . I may appear to be talking a little strongly, but with a large number of friends, who have invested considerable sums in tea, and whose £10 are not worth £2 today, we feel, naturally, a little hurt. I have still to tell my friends that tea is a good thing, but that on all sides it is completely overdone, and that foolish and absurd competition increases the output. I can only defend myself in that way, and in a

company like this I can only try and beseech you that you will not put out any more area, and, if you can by any chance, throw some of the ground out of cultivation—throw it into the Brahmapootra, if you like.

Mr Sanderson: And let other companies extend theirs!

Mr Seton: I am speaking in the interests of all the shareholders, and what is the mind of the great leaders of the industry who are actually meeting together in solemn conclave to find out a scheme whereby they can take a certain amount of their tea off the market.

Mr Densham:—You are comparing sovereigns to pennies.

Mr Seton:—I hold that there is too much tea at a certain period of the year; but we have had a rude awakening in the last six months as to the extraordinary price to which good Assam tea can fall. In 1901-2 we had an extraordinary fall in fine Assam tea to tenpence, and now Assam is selling at sevenpence. That is a worse fall relatively, because the cost is so much greater.

Then came a question, to which no answer was given:—

Colonel Nowell: I want to ask one question. Is it not a fact that the quality of Assam teas has not deteriorated during the last few years, but that the quality of the Ceylon teas has deteriorated, and is deteriorating year after year?

A practical planter, Mr. Jackson, stated:—

No doubt, while the difficulty of obtaining labour is so great, and the price of tea so low, it would be wise to stop all extension for a bit, but as soon as the opportunity offers extensions should be gone on with on that side in preference to the other side. I think that the present position of the company is chiefly owing to the fact that the difficulties of opening up in such a place as Makum were under-estimated at the very start. (Hear, hear.) The original scheme of the company was 2,200 acres for about £63,000; or £30 an acre; the actual scheme has been 1,860 acres for £150,000, or £80 per acre. On £80 an acre it is difficult to make tea pay, and if any tea could pay it would be Makum tea. Then, again, I think the extensions were originally pushed on so fast that instead of being able annually to fill up all occurring vacancies, young plants have been taken afterwards to fill up the vacancies left. The young plants are taken from the nursery; they are taken from virgin soil to virgin soil, but when you take them from virgin soil to five-year old tea ground and fill in, they never get up to the tea originally put in, and to a great measure that accounts for the small outlay . . . The old garden, I consider, is unwieldy. As a rule we find that 1,000 acres is big enough for any garden, and on flat land there are generally two factories. In Makum matters are considerably worse, because it is out up by small ravines and streams. Even 1,000 acres would be unwieldy, but on one block we have there 1,400 acres, and the distance the coolies have to go causes tremendous waste.

All this is instructive; and finally the Chairman explained the over-supply of tea:—

It is entirely the result of the enormous extensions that were made four or five years ago when there was a 13d rupee. At that time tea was very profitable and extensions cost very much less than they would cost now. The result was that tea was put out to the extent of thousands and thousands of acres, and these thousands of acres are only coming into bearing now, and therefore the market for tea, I am afraid, will be gorged for the next two or three years, and that the weak companies will have to go to the wall. . . . There is plenty of Ceylon tea, but the quantity of Makum tea—tea of the quality of the Makum garden —is comparatively small, and we got a very good price for it last year.

And so the meeting no doubt got the idea that *all* Ceylon tea is inferior: a very foolish notion,

PEARL DIVING ON THE NORTHWEST AUSTRALIAN COAST.

One of our soldier readers, Mr Alexander Macdonald, late lieutenant of the Australian Bushmen, writes:—There are still a few corners of the earth which remain but little known to those who are content to glean their information of far-off lands from tourist guide-books and out-of-date geographies, and for a long time to come they are likely to remain immune from the visits of the orthodox traveller. One of the most interesting of these remote districts is that part of the North-West Australian coast which runs north-north-east from Cossack, under the 20th parallel towards Port Darwin, and thence further to eastward into the Gulf of Carpentaria. This vast "corner" of the Globe is but the fringe of the great Terra Incognita of Australia, whose grim mountains and trackless deserts have lured many an explorer to his doom. The shadowy Leopold Ranges in the north are known to contain much gold and other mineral treasure, but fiercely hostile tribes of aborigines infest the mountains and rigorously guard their domain, so that only strong parties dare venture near their chosen haunts. But if this dangerous division of the Island Continent demands only the reckless pioneer's attention its seaboard is comparatively free from the besetting risks of the interior and here a fascinating industry is carried on, the very existence of which is probably unknown to most people.

WHERE THE PEARL DIVERS WORK.

Seldom do strangers journey so far distant from civilisation as this lucrative coast of which I particularly write; even in the great Australian cities little knowledge can be gained of the North-West, and those who periodically return from that region are never inclined to be communicative regarding their work. And yet, along this mangrove-lined beach, extending seawards in some places for many miles, some of the world's finest gems are found. The rich "shallows" stretch right round the coast and into the Gulf, but the main area of operations lies between Cossack and King Sound; and Roebuck Bay, about midway between these boundaries, is recognised as the pearling centre for all the fleets engaged. The largest settlement on these waters is that of Broome, which is situated at the opening of a mangrove-fringed creek at the head of Roebuck Bay, and though my description of it will doubtless give much offence to those who have grown to love their reeking and evil-smelling "metropolis," still I cannot but say that it is one of the most "God-forgotten" camps it has ever been my lot to strike, and I speak as one who knows the world well.

THE PEARL-DIVERS' TOWNSHIP OF BROOME.

The population of this township is composed for the most part of Malays, Japanese and Manilamen, who form the crews of the various lugger craft. The Manilamen, as the natives of the Philippine Islands are termed, make good divers, and their wonderful vitality has been proved on many occasions when accidents to the pumps and diving-gear made their existence below water rather doubtful. When many ships come into port at one time, or when the Monsoon season renders diving work impracticable, the various nationalities combine in making day and night—especially the night—hideous with their drunken squabbles, and not infrequently knives are drawn and brutal

murders committed among themselves, though details of such occurrences rarely reach the outside world. The white members of the community are small in numbers, and totally unable to cope with any serious disturbance that might arise; and, besides, they are mainly responsible for the demoniacal state of affairs usually existing. With one or two notable exceptions, the master pearler, be he captain of a schooner or lugger, does not remain on shore at this settlement any longer than is necessary for him to tran-act his business and engage his crews for the season, for any trip he may be comtemplating. These exceptions, and one of them is very notoriously notable indeed, run the vile beer saloons, or "stagger juice factories," as they are often called, for the nature of the fluid vended is villainous in the extreme.

A TWO-MASTED PEARLING LUGGER.

The pearling lugger is a small two-masted craft, or schooner, varying from 30 to 35 feet in length, and having a beam of about twelve feet. It is specially peculiar in having a very low freeboard, so low, in fact, as to render its life on a choppy sea somewhat precarious; but this design is brought about because of the heavy-weighted diver's inability to climb or descend over a high gunwale without considerable assistance, which assistance can rarely be forthcoming, owing to the few men considered necessary for the proper manning of such boats. At one time aboriginal divers were in the habit of descending in the shallower waters without the aid of either helmet or diving dress, but the numerous sharks and octopoda have just put an end to that practice, though many lives were lost before any precaution was considered necessary. The average depth at which the pearl-shell beds are found is twelve fathoms, but now and again a rich strike may be made at the fifteen or even twenty fathoms level, though no diver cares to work for any time in these deeper waters, and with the present form of diving-dress the pressure on the limbs is very severe even when but a few fathoms down. It is often stated that divers occasionally explore the coral deeps at thirty and forty fathoms, but such assertions are utterly absurd and the writer may say with truth that a colossal fortune awaits the inventor of a diving dress by which the lower shell levels of North-West Australia may be exploited.

HOW PEARL DIVERS WORK.

When above "a patch" the diver is lowered overboard with little ceremony, and commences his work when he recovers himself at the bottom, after first examining the plunger line, which has been his sole guide in the descent, and making sure that it has not sagged against the myriad coral cups surrounding him, for he may have to depend his weight on this line, should any chasms intervene in his course. The vessel above glides slowly onward with all sail furled, moving by the force of the various currents or the water's ripple only. The anchor is never used, for the pearl oysters are few and far between, and a score of yards and more may divide each pair of shells. So the diver follows below in the lugger's wake collecting his finds into a small net he carries attached to his left arm, and when this receptacle is filled he signals to be raised to the surface, where he is quickly relieved of his precious load. With luck a good diver may raise several hundredweight of shell in a day, but more often he has to be content with very much less. The owner of a lugger pays the diver by results, so that he is assured of the latter's conscientious effort, but sometimes days may pass without much return when new levels are being prospected. The shell is a very valuable commodity, and forms indeed the backbone of the fascinating industry, for pearls are scarce, and though commanding fabulous prices, they would not in themselves pay for the labour expended in searching for them. When it is calculated that mother-of-pearl is worth about £150 a ton, it is at once evident that the pearler pursues quite a lucrative profession even if he should never be fortunate enough to find a single pearl.

PEARL HUNTING IS SOMETIMES DANGEROUS.

The life, as may be imagined, is one strangely attractive, but at times a gloom falls over the entire fleet when some of the luggers' crews mutiny, and in their fiendish rage wreak a dire vengeance on the one or two white men at their mercy; for these coloured crews have a long simmering hatred against their employers, whom they judge by the standard of the renegade whites who, while dispensing their villainous intoxicants, cheat the poor wretches out of their savings. The Ninety-Miles Beach, in the summer season, is a favorite haunt of the pearlers. This coast extends from Cape Bossut southwards to Pot Headland, and scores of luggers then make Lagrange Bay their headquarters instead of Broome; and the supply schooners, also, rather than remain anchored at sea, seek the shelter of the numerous salt water creeks inshore, and thus they form a township of stranded vessels, which would strike the stranger as being a most peculiar sight indeed.

A MOSQUITO-INFESTED REGION.

It is no exaggeration to say that the mosquitoes of this region make one of the principal objections to the country. A "new chum" appearing in their midst would be positively eaten alive. The air is black with them, and at night their vague hum is intensified to a vicious shriek, which sounds as a long sharp note on the quivering air. Even the toughest whisky sodden specimens of humanity cannot withstand their attacks. I have known men imbibe an enormous amount of the afore-mentioned "stagger-juice" in order to remain unconscious of the "torpedoes'" onslaughts, but I have also seen them wake up before midnight, sober as judges, cursing the torturing pests as only such men can.

"THE LEGION THAT NEVER WAS 'LISTED."

There are some very fine men engaged in the pearling traffic, as well as some of the worst products of humanity, but the former are well in the majority, and by them the whole industry is influenced. One well-known individual on the "grounds" at the present time is known as "Gentleman George." He has been for twenty years a self-exile from civilisation, and the probability is that he will never return to his native land; but many men with strange histories are encountered in the far remote corners of our Empire, and such cases arouse little surprise in the wanderer. This man, however, leads an active and useful life; he was the pioneer of the north-west coast, and has ever been a reckless dare devil, feared by many, yet respected by all around. His name was given him spontaneously many years ago, and he deserves his title in its true sense.—*New Zealand Mail*, June 25.

PLANTING IN THE STRAITS: COCONUTS.

We are in receipt (rather late in the day ?) of the minutes of the annual general meeting of the United Planters' Association, F M S, held at the Selangor Club, Kuala Lumpur, on Saturday, 3rd May. *Present*,—Messrs. E V Carey (Chairman), T H Hill, C Meikle, W R Rowland, E B Prior. P W Parkinson, J G Glassford, O B Pfenningwerth, J M Halliday, A M Barnwell, A Irving, H M Darby, M S Parry, E B Skinner, *Visitor*:—Mr J L Anstruther. *By Proxy*:—S Moorhouse. The only matter of interest to us is the following in regard to coconuts:—

COCONUT BEETLE.—The following resolution was proposed by Mr C Meikle and seconded by Mr H M Darby:—"That the condition of the coconut cultivation is seriously endangered by the ravages of the coconut beetle and that the Government be asked to take such steps as will eradicate the pest as far as possible." Mr Meikle said that the condition of the trees in Kuala Lumpur and Klang was disgraceful and he thought the sooner Government started to adopt stringent measures the better it would be. Mr Darby said that the beetles down at Klang were very bad amongst trees ranging from 18 months to 2½ years old and in many cases trees were riddled by them. He had already reported to Government that a coconut estate belonging to Tamils was badly infested with the beetles. He considered that it would be best for Government to appoint special inspectors to go round, instead of doing it through the Penghulus. Mr Prior also attested to the bad condition of trees in Klang. Mr Parry suggested that if, after the matter has been reported to the District Government representative, no steps are taken in the matter, the complainant should then appeal direct to the Resident. Mr Rowland said that he had a coconut estate in Negri Sembilan, but so far had not discovered any beetles on it. Mr Hill stated that when Mr Birch was Resident in Negri Sembilan the Negri Sembilan Planters' Association had approached him on the state of the coconut beetle and that steps were at once taken by Government to control the pest with the result that there are very few places there now suffering from beetles. Mr Halliday suggested that owners of trees attacked by beetles who do not take immediate steps to clear them, should be fined as they are in Singapore. The Chairman said that Government would be only too pleased if planters would report places which were known to be infested with beetles. The resolution was carried unanimously.

CASTOR OIL MANUFACTURE.

Up to the present nothing has been done locally in the way of extracting oil from the castor oil plant. Briefly, the operations of oil extraction are by expression, by boiling with water, or by the agency of alcohol. A comparatively simple process can be tried by anyone interested, and a good oil should result if the seed is of the right variety.

First, cleanse the seeds from fragments of the husks and from dust, and submit them to a gentle heat, but not greater than can be borne by the hand, which process makes the oil more fluid and more easily expressed. A whitish, oily fluid is thus obtained, which is boiled with a large quantity of water, and all impurities are skimmed off as they rise to the surface; the water dissolves the mucilage and starch, and the albumen is coagulated by the heat, thus forming a layer between the oil and the water; the clear oil is then removed and boiled with a small quantity of water until aqueous vapour ceases to rise, and a small quantity taken out in a phial remains perfectly transparent and cool.

The effect of this is to clarify the oil and rid it of volatile acid matter. Care is necessary not to carry the heat too far, as the oil would acquire a brownish colour and an acid taste. In India the seed is first shelled and then crushed between rollers, placed in hempen cloths and pressed. The oil is afterwards heated with water in a tin boiler until the water boils. This serves to separate the mucilage and albumen, the product being then strained through flannel and put into canisters. Any oil-press would suffice for extracting oil for ordinary purposes, and by decantation and some process of filtration it could be purified. Cheap wooden rollers would serve the purpose, and these could be driven by a horse-gear, after the fashion of driving the old horse-mills for crushing sugar-cane.—*Queensland Agricultural Journal.*

RUBBER PLANTING IN THE MALAYAAN PENINSULA AND BRITISH NORTH BORNEO.

A little while ago Mr. H. K. Rutherford pressed us to try and obtain statistics of the area planted in Rubber in the Straits, &c. It is a difficult matter to do so as there are so many different States and Districts embraced in the Malay Peninsula. But from the returns given in the Singapore and Straits' Directory for 1902 which has just reached us, we venture to compile the following figures, simply as a rough approximation:—

District.		*Area under Rubber.*
B. N. BORNEO ...	About	100 acres
JOHORE ...	"	200 "
NEGRI SEMBILAN ..	"	678 "
PERAK ...	"	540 "
PROVINCE WELLESLEY ..	"	100 "
SELANGOR ..	"	2,926 "
Total ...	"	4,544 "

This is against 3,356 acres in Ceylon. But our local returns are far more to be relied on, than the guesses we have applied to the estates in the Straits, &c. It should be the duty of the Selangor Planters' Association to collect reliable returns of the actual extent of Rubber planted on each garden or estate, and so to correct the figures which we venture to put forward above.

THE LITTLE TIN TICKET.

Ramasamy, come hither, I've something to say
About the new system, the Government way
Of travelling free of all fuss and delay
With a numbered and lettered tin ticket.

You will find it will save you from bother and loss
Whenever you wish the 'black water' to cross,
And you need not be cheated wherever you doss,
If you've only a little tin ticket.

It is not exactly a 'circular note,'
But will bring you back free on the railway and boat
You may pay for your betel—for food not a groat:
That is done by the little tin ticket.

Kanganies will hoax you with charges for food,
They will take you to places whose names are not good,
And many false items your bill may include,
If you have not a tittle tin ticket.

Whenever you leave your beloved estate
Take one of these tickets across the dark strait,
It will help your return at a wonderful rate,
This little tin Government ticket,

You come to the depôt: the pass lets you in,
But *not* like the robbers of Tuticorin,
Who would steal from the dying: their system of sin
Is checked by the little tin ticket.

You can travel by train and cross over the sea
And then come back again to the *totam* and me,
Paying nothing whatever: your bill comes to me,
If you 've only the little tin ticket.

If your brother can't get from his *dorai* a pass
As that *dorai* belongs to a curious class
Of animal known for its patience, alas!
He must go without any tin ticket;

But ere he comes back he can write him and say
He is ready to start on the very first day
That he 's able to travel with nothing to pay,
And he *must* have a little Tin Ticket.

NEWLYN PIERCE.

MERCANTILE LIFE IN COLOMBO 40 YEARS AGO.

(BY THE SENIOR ED. "C. O.")

A stirring and even romantic chapter might well be written on the "ups and downs" of mercantile life in Colombo during the past 70, 50 or even 40 years. We can merely touch the fringe of the subject in this preliminary note. Of course the traditions of the "thirties" and "forties" were familiar talk in the Fort in the early "sixties." We had a real *Fort* then, enclosed by walls as well as batteries, a deep wide moat crossed by drawbridges with sentry-mounted mediæval winding gates which bore the mark of Cohorn and the

DUTCH EAST INDIA COMPANY.

The 24 European mercantile houses in Colombo and their 60 to 70 resident partners and European Assistants* were naturally thrown much together; they had their cliques, likes and dislikes and yet approached nearly to one big circle of friends, living under the shadow of banishment from "home" with only a fortnightly mail (by P & O) via Galle, and no telegrams, while most of the travelling (and all the heavy freight) between Ceylon and England, passed round the Cape of Good Hope, a voyage of 15,000 miles occupying from 80 to 110 days according to the vessel and weather.

Among the early Fort traditions was the strong opposition of the Merchants to the Government of Sir Robert Wilmot Horton (1831 to 1837) and how (in 1834) they started the *Observer*, the first newspaper independent of Government in Ceylon, and placed one of their number,

MR. GEORGE WINTER

in charge of it as Editor. The Governor could get no European to enter the newly-formed Legislative Council and was obliged to fall back on pensioners or recognised Government protegees to fill the Ceylonese seats. The mercantile opposition gradually died down, however; Mr Winter got tired of his task; and the paper was sold to Dr. Elliott. With the next Governor, the Rt. Hon. Mr Stewart-Mackenzie, the merchants worked amicably; but the ablest man amongst them—Mr Acland—was always more or less in opposition. The burst into coffee and the great boom from 1837 to 1845 followed by the financial crash in the latter year, tried Colombo houses very severely and many disappeared. In the dull time that followed, there were some happy hits in money-making. One proprietary planter, but who had a Liverpool mercantile training, bought up all the

"NATIVE COFFEE"

—a big crop in those days—for "a mere song" (as he told us long after), shipped it round the Cape and it arrived in London six months after, to a vastly improved market, so that he cleared cent. per cent., and immediately founded a mercantile house in Colombo, with later on a branch in Madras, and both continued for thirty years until the partners having made fortunes in cotton, gradually cleared out. But the head could not be idle and speculating with the great "Collie's" lost his all and had to begin life again in his old age. What an extraordinary record of both planting and mercantile experience the story of "C.S." would afford, if he only continued the tale, from his last instalment in our columns published a good many years ago!

It may well make brisk young mercantile men of today to stare, to learn that forty years ago, it was not considered "good form" to advertise any special consignment—say of

QUARTER-CASKS OF MADEIRA!

—until your neighbour had got rid of his stock. To go and compete at a Kandy land sale with a man who had selected any particular jungle "block" for himself by going to the spot, was thought most dishonorable—up to the time that Tottenham got a number of Haputale forest lots put up, and the spirit of competition became too strong and old-fashioned arrangements broke down. [On one occasion thereafter, seven would-be purchasers met at the Kandy Kachcheri and finding that 7 blocks were to be sold, drew lots and arranged the matter amicably; but alas before the last two were offered, one or two strangers to the bargain, dropped in and there was a severe struggle and high prices to the advantage of the revenue.]

The American Civil War—1861-5—and the blockade of cotton, enabled longheaded Bombay and Colombo merchants to amass rapid fortunes. We compiled and printed a telegraphic Code for a local Firm to be used between Bombay, Madras and Colombo (there was no cable to Europe) and *sixpence* was the maximum we were ordered to put in for Tinnevelly cotton (the price then being 2½d per lb.); but we ventured to compile up to the shilling—and yet in 6 months, the Code was useless, the price advancing to 1s 6d! Fancy cargoes of

TINNEVELLY COTTON

bought by Colombo merchants through their Brokers at from 2d to 4d a lb. being worth 1s, 1s 3d and even 1s 6d a lb. before they reached Liverpool or London four months after! E. J. Darley and his partner, S. Butler, whose names and Firm still continue; Alex. Gibson of Alstons, Scott & Co., Charles Shand and J. C. Fowlie made the largest profits, —Wilson Ritchie & Co. and Crowe & Co. following later. Piece Goods too was a safe and profitable business in the early days, since a Chetty breaking his word or bond was, at that time, absolutely unknown! But most of the Firms of the early sixties stuck to "coffee" and their Agency work and among them were Geo. Steuart & Co. (with Messrs. Geo. Steuart and Geo. Mackenzie), J. M. Robertson & Co. (Mr. Murray Robertson, senr., Mr. Geo. Christian), Mackwoods & Co. (Capts. Wm. and F. Mackwood and Mr. F. Smith), R. B. Carson (now Carson & Co.), and some others not now in existence of which Geo. Wall & Co. and J. I. Strachan & Co. were the chief,

* In 1902, there are not fewer than 90 Firms in the Fort with nearly 400 Europeans on their office staffs.

There was also Nicol, Cargill & Co. of which was C. B. (country-bottled) Cargill who, afterwards became Premier of Dunedin or Invercargill Province, and of whose survival now in a good old age we heard the other day in a letter from New Zealand. We well recall cheery and stately Sylvester Trant Richmond* who was a partner in the Firm (and our great Military authority in those days) coming into our office with a copy of a Dunedin paper giving on the one page a speech by the Premier and on another an advertisement saying that C. B. Cargill sold Straw, Hay, etc. Everything is grist to the mill in a new Colony.

*There was no Broker in Colombo in the "sixties"; but a well-known Broker of the present day who came out to be Assistant under Mr. Richmond in 1899, declares that he was the finest specimen of a British Merchant of the old school high-minded, honourable straight and liberal) he has ever known, and to this, all who were acquainted with out old friend, will undoubtedly subscribe.

THE GEM TRADE OF CEYLON.

"GOES STEADILY ON."

VALUABLE CAT'S-EYES AND OTHER JEWELS.

Attention was recently attracted to the gem trade of Ceylon by the announcement that Messrs. M. Ismail & Bros., Jewellers, Galle Face Hotel, had become the possessors of two catseyes which at one time had been a single stone weighing 340 carats in the rough. The stone had been cut into two—one weighing 105 carats and the other 71 carats. The colour was between light and olive green, of admirably oval shape, the bodies being neither opaque nor too transparent, setting forth bright silvery rays of a dazzling straight nature. The estimated value of these stones is R50,000 and R30,000 respectively; both were shipped to the London market, and it is time we heard of the result. [Not yet sold, we are told.]

Later on we had the pleasure of examining some most valuable jewels in the possession of another well-known firm. In particular we were shown a very magnificent catseye weighing over 100 carats and valued at £3,000. Of an olive green colour, with a perfect white ray, the gem exactly matches the description, in colour, given by Mr. Streeter in his book on gems. The gem has been in the possession of the firm for several years. Attempts have been made to purchase it—on one occasion an offer of R30,000 having been made for it on behalf of the Nizam of Hyderabad. The owner, however, finds the gem most valuable for advertising purposes and refuses to sell it under value. Among the other gems shown us was a smaller catseye of much lighter colour, weighing 40 carats. This jewel, although not so valuable as the larger one —being valued at R10,000—is much more attractive and has also a white ray running through it. A beautiful pink star stone, which along with the catseye, is the only jewel which defies imitation, was also shown us. The stone which is over 100 carats is a perfect specimen, with six rays. It was found in Ceylon and is valued at R5,000. A real Ceylon ruby, beautifully cut, weighing 20½ carats, is certainly the finest we have seen in Ceylon. It is valued at R25,000 but it has been so much admired that the owners are loth to part with it. The stone, along with a particularly good blue sapphire stone, weighing 30 carats and valued at R3,000, was found in the Ratnapura district.

These particulars tend to show that the gem trade of Ceylon is not the "baseless fabric of a vision" which of late years people have begun to suppose it is. Rubies, it is true, have not been plentifully found for the last four or five years; nor have there been any big finds recently until these catseyes of Messrs. Ismail and Bros., but the trade goes steadily and regularly on.

DESTRUCTION OF TROUT FRY AT OOTACAMUND.

Ootacamund, July 19.—I hear that the heavy floods in the Pykara River have breached the lately constructed fish pond in which the newly hatched trout fry of the Nilgiri Game Association were placed some weeks ago and that all the fry have been washed away. The Association has had consistent ill-luck in its efforts to introduce trout into the Nilgiri streams, and I hope that better fortune will attend the consignment of ova which Major Bagnall is to bring out with him from England.—*Madras Mail*, July 21.

PLANTING NOTES.

GROUND PUMPKIN SEEDS FOR FOWLS.—Fowls are very fond of cucumber and rock-melon seeds, and young cockerels will eat them in preference to wheat. They also are partial to pumpkin seeds broken up small. Where cows are fed on pumpkins there are always large quantities of seed, which are not fed to cattle. These, if cracked small, would form a valuable food for poultry. Those who have tried it say it increases the fertility of laying hens.—*Queensland Agricultural Journal*. 1st June.

BEST BREEDS OF FOWLS.—The following extract is taken from an interesting article by Mr W B Tegetmeier in *The Country* for April last:—The question may therefore be asked by those who keep poultry for practical and useful purposes, What breeds shall we employ, and what system of keeping shall we pursue? If eggs are the chief desiderata, the best breeds to adopt are those which do not incubate, such as those known at the present time as Minorcas, Leghorns, Andalusians, and Hamburgs. Of these the two former are unquestionably the best, inasmuch as they lay the largest eggs. But the system pursued varies greatly, as do the conditions under which the fowls are kept. It is almost needless to say that the most advantageous method of keeping fowls is in localities where they have an extended range, finding for themselves a great portion of their natural food—worms, insects, seeds and herbage of various kinds. Under these conditions, fowls only require a clean roosting-house and feeding twice a day to yield a good supply of new-laid eggs, provided the hens are kept for two years and not beyond that time, as the second year's laying exhausts the great prolificacy of any hen, when her services should be at once transferred to the stock pot.—*Agricultural News*, June 21.

CEYLON TEA AVERAGES IN LONDON.

FOR JUNE SALES.

Messrs. Geo. White & Co.'s highest results for each group of districts for June sales are as follows:—

1.—Udapusseilawa, Nuwara Eliya (6,200 ft), New Galway—Dimbula and Lindoola. (From 3,500 to 6,500 ft). Outlet—Nanuoya (5,300 ft), and Talawakelle (3,900 ft).

Estates and Marks.	Pkgs	Avge. s	d	Grades	Range of Prices. s	d		s	d
Goatfell ..	318	1	0½	*abe*	0	5½	@	1	4¼
Tillicoultry ..	403	0	11¾	*abcd*	0	5½	,,	1	5¾
Henfold ..	223	0	10½	*abc*	0	6½	,,	1	2¼
Holmwood ..	53	0	10¼	*abe*	0	6¼	,,	1	2
Diyanilakellle ..	129	0	10½	*abef*	0	6¼	,,	1	5
Talawakelle ..	395	0	10½	*ab*	0	7½	,,	1	5
Clydesdale ..	136	0	10¼	*abd*	0	7½	,,	1	0¾
Mount Vernon ..	147	0	10	*ab*	0	8	,,	1	10¼
Portmore ..	216	0	10¼	*abd*	0	7¾	,,	0	11½
Waverley ..	287	0	10¼	*ab*	0	8½	,,	1	1¼
West Holyrood ..	124	0	10¼	*ab*	0	8¾	,,	1	1¼

3.—Lower Dikoya, Ambagamnwa, Kotmalo (From 1,500 to 4 500 ft), Yakdessa and Dolosbagie. Outlet —Wattewela (3,200 ft), aud Nawalapitiya (1,900 ft).

Gallebodde ..	322	0	6¼	*abcd*	0	5	@	0	9¾
Imboolpitiya ..	347	0	7	*abe*	0	5	,,	0	8½
Paragalla ..	116	0	6¼	*abce*	0	4¾	,,	0	8¼
Queensberry ..	310	0	8½	*abcd*	0	5½	,,	1	0¼
St. Leonards ..	82	0	6¼	*Green*	0	5¾	,,	0	6½
Shannon ..	62	0	6¼	*ab*	0	5¾	&	0	6¾
Weemalle ..	34	0	5½	*ab*	0	5	@	0	6¼
Windsor Forest ..	109	0	5¾	*abc*	0	5	,,	0	6½

4.—Pussilawa, (3,000 ft) Rambodde, (3,500 ft.) Pundaloya and Kaduganawa. (From 1,500 to 5,000 ft.) Outlet Gampola (1,600 ft) and Kaduganawa (1,700 ft.)

Allagalla ...	164	0	6½	*abcde*	0	4¼	@	0	7¼
Atabagie ..	182	0	5½	*abcde*	0	3¾	,,	0	6¼
Beaumont ...	328	0	5¼	*abc*	0	4½	,,	0	6¼
Condegalle ..	205	0	5¾	*abe*	0	4½	,,	0	7¼
Dartry ..	162	0	5½	*abc*	0	4¾	,,	0	5¾
Dunsinane ..	758	0	8	*ab*	0	6¼	,,	1	0
Ferulands ...	118	0	10	*abce*	0	5¼	,,	1	1
New Peacock ..	427	0	6	*abc*	0	4¾	,,	0	6¾
Pundaloya ..	110	0	8¾	*abc*	0	6¼	,,	0	11¾
Sheen ..	126	0	10½	*abc*	0	7¼	,,	1	2

5.—Hantane, Nilambe, Lower and Upper Hewahetta, Matnrata, Dumbara, Rangala. Nitre Cave and Medamahanuwara. (Rising from 1,200 ft in Dumbara, to over 5,000 ft in Upper Hewahetta). Outlet—Kandy 1,700 ft) and Peradeniya (1,600 ft.)

High Forest ..	188	0	7½	*a*	0	6¾	@	0	8
Loolecondera ..	529	0	7¼	*abc*	0	5	,,	1	0
Mahacoodagalla ..	321	0	7¼	*abde*	0	4½	,,	0	9½
Rillamulle ...	155	0	7¾	*abcd*	0	4¾	,,	0	9¾

6.—Kellebokke, Knucklos, Hunasgeria and Panwila. (From 1,600 to 4,500 ft.) Outlet—Wattegama, (1,600 ft.)

Deyanella ...	74	0	6½	*abce*	0	4¼	@	0	6¾
Gavatenne ...	111	0	7	*ab*	0	6	,,	0	8
Richlands ..	105	0	6¾	*abce*	0	4¼	,,	0	10¼
Wattakelly ...	77	0	7¼	*abce*	0	4¼	,,	0	8

7.—Matale, East and West. (From 1,2.0 up to 3,500 ft.)

C'galla ..	61	0	6¾	*abce*	0	4	@	0	7
Dangkande ...	71	0	6	*abc*	0	5	,,	0	6¾
Midlands ..	281	0	6	*abce*	0	4½	,,	0	7
Opalgalla ..	181	0	6	*abcd*	0	5	,,	0	8¾
Pitakande Group ..	92	0	6	*abe*	0	4¼	,,	0	6¼
Suduganga ..	95	0	6	*abcd*	0	4¼	,,	0	7¾
Syston ..	114	0	6¼	*abc*	0	5½	,,	0	7
Warriapolla ..	91	0	6¼	*abcd*	0	4¼	,,	0	8½

8.—Kurnegala, Polgahawela (From Sea Level up to 2000 ft.) Kegalle and Henaratgodde. Outlets—Polgahawela and Colombo.

Hunugalla ..	201	0	5½	*ab*	0	5	@	0	6
Karandupona ...	53	0	4½	*abc*	0	4	,,	0	4¾

23

9.—Kelani Valley, Avisawella, Yatiyantota, Kittoolgalle and Lower Dolosbagie, Outlet—via Kelani Valley. (From 200 to 600 ft.)

Dunedin ..	129	0	5¾	*abe*	0	4¼	@	0	6¾
Elston ..	303	0	7½	*ab*	0	6	,,	0	9¼
Kumaradola ..	28	0	6¼	*abce*	0	4	,,	0	7
Penrith ..	433	0	5¾	*abcde*	0	4	,,	0	6½
Veralupitiya ..	68	0	5¾	*abce*	0	4¼	,,	0	6½
Weyweltalawa ..	102	0	5¾	*abcde*	0	4	,,	0	6¾

10.—Kuruwita, Ratnapoora (100 ft,) Rakwana (2,000 ft) Balangoda (1,700 ft) and Knkulu Korale. Outlet—via Kaluganga and Ratnapura Road. (From 100 to 4,000 ft.)

Detenagalla ..	298	0	6½	*abcd*	0	4½	@	0	8¾
Maratenne ..	285	0	6¾	*abce*	0	4¾	,,	0	8
Rasagalla ..	97	0	6	*abce*	0	4	,,	0	7¼

11.—Kalutara and Bentota Districts. (100 to 500 ft), Outlet—via the Coast Railway.

Gikiyanakande ..	299	0	6	*abcd*	0	5	@	0	6¾
Nawalakande ...	63	0	6¼	*abe*	0	5	,,	0	7¾

12.—Udagama (From 100 ft), Morowak Korle (Up to 3,000 ft.) Outlet—Galle.

Campden Hill ..	343	0	5¾	*abc*	0	4¼	@	0	6¼
Valleyfield ..	212	0	5¾	*abcde*	0	4½	,,	0	7½

13.—Haputale (Haldummulla, 3,200 ft), Badnlla (2,200 ft), (From 2,000 to 5,000 ft) Madulsima 4,000 and Passara (From 2,000 to 4,500 ft). Outlet—Hapntale (By Ry. Station, 5,200.)

Batgodde ..	107	0	7½	*abde*	0	4¼	@	0	11¼
Berragalla ..	235	0	7½	*abcde*	0	4¾	,,	0	10
Cannavarella ..	625	0	7½	*abcde*	0	4¼	,,	0	10½
Glenanore ...	131	0	7¼	*ab*	0	6	,,	0	8¾
Gonamotava ...	356	0	7¼	*abcd*	0	4½	,,	0	10¾
Kelliebedde ...	136	0	7¾	*abce*	0	5½	,,	0	9½
Nayabedde ..	463	0	7½	*abce*	0	4½	,,	0	10¼
Poonagalla ...	64	0	7¾	*ab*	0	6¾	,,	0	9¾
Thotulagalla ...	187	0	7½	*ab*	0	6¼	,,	0	10½

The letters given refer to the different grades as follows:—"*a*"=Pekoe; "*b*"=Broken Pekoe; "*c*"=Pekoe Souchong; "*d*"=Broken Tea; "*e*"=Dust; and "*f*"=Unassorted.

A NEW PEPPER.

A new pepper from Kissi, Upper Guinea, on the frontier of Liberia, has been brought before the "Académie de Sciences," Paris. The corns are small, contain manganese, and are good for spice or condiment. It is called after M. Famcchon, the discoverer, and is expected to become a colonial product.—*Globe*, July 4.

A FIND OF QUICKSILVER IN MALABAR.

Calicut, July 22.—Recently, while the Railway construction officials were working at Edakad, between Tellicherry and Cannanore, Mr A Sayers, Bridge Inspector, came upon deposits of quicksilver near a spot called "Sheitan Kunnu," or Devil's Hill. The deposits apparently exist to a profitable extent, for Mr J B Burnett, having inspected them, has already formed a Company under the title of the Tellicherry Quicksilver Syndicate to work the mineral. I learn that all the shares of the new Company have already been subscribed for, and it is to be hoped that Mr Burnett's commendable enterprise will prove profitable. It may not be generally known that so far back as 1858, the existence of quicksilver was reported in a bed of laterite at Cannanore.—*M Mail*.

THE ASSAM LABOUR SUPPLY.

CAUSES OF THE DECREASE.

Calcutta, July 23.—In 1901, 30,777 emigrants were despatched to the labour Districts of Assam, as against 65,190 in the previous year. The Government, in its Resolution published today, says that this great diminution is partly explained by the fact that the year 1900 was a famine year in Chota-Nagpur, and is also ascribed by the Commissioner of the Division to wild stories having been circulated, exaggerating the responsibilities incurred by garden Sirdars under the new Act. There is a further and, to the planter, a more serious reason. The coal mines in Bengal have increased rapidly of late both in number and size, and the mine owner is now a formidable competitor with the tea planter in the Districts of labour supply. He gives higher wages, and the mines have at least the attraction of being nearer to the Districts of recruitment.—*Madras Mail*, July 24.

MICA OR TALC.

The very large sheets of mica, which at one time used to fetch fancy prices on the London market, now seem to have fallen out of use, owing, we believe, to substitutes being used. At any rate at the sales held on 9th July the larger size sheets were neglected, the same as at previous sales, the demand being more for medium and small medium sheets, especially if clear and suitable for electrical purposes, and the prices realised for such were rather better than at last sales. Very small mica and films were out of favour and met with no demand at all. So all had to be bought in.

A GOOD TREE FOR TEA ESTATES.

A Dimbula Manager writes:—

"*Re* your article on tree growing, one tree that grows well upcountry, which has not received the attention it deserves, is the *Iolantha glandulosa*.* There are some fine specimens of this tree on Glasgow Estate, Agrapatnas, age about 10 years. It grows very nearly as quickly as the *Robusta* gum or Red Toon, and for growing amongst tea it is greatly preferable to either. I can say nothing as to its merits as a timber tree, but it should make good fuel."

How does it compare with the favourite Grevillea?—will be the first question asked.

A NEW INSECTICIDE.

We referred some American pamphlets, recently received, to Mr. E. E. Green, the Entomologist, who kindly writes:—"The one on Carbon Bisulphide, as an insecticide particularly interested me. I have always realised the important part this insecticide might play in Ceylon, *if only we could procure it in quantity here.* At present it cannot be obtained for love or money, except in small quantities as a drug. The shipping people are afraid of it and will not accept it as cargo. With the aid of Carb. Bisulph., white ants might be practically exterminated with ease. Then it is invaluable for destroying all the larger wood-boring insects without the necessity for hacking the tree to pieces."

* We cannot find this name in any of our botanical or Timber-trees' books of reference. To what country does the tree belong?—Ed, *T.A.*

PEAT TRANSFORMED INTO COAL.

A German and an engineer of Swedish natitionality, named Fritz and Schöning respectively, have succeeded in transforming peat into coal. Coal, as Macaulay's Schoolboy knows, consists of metamorphosed vegetable matter which flourished ages ago on the earth's surface, the change having been brought about under the combined influence of heat and pressure. Messrs Fritz and Schöning simply imitated Nature in their experiments. They subjected peat to a pressure of one hundred atmospheres, that is one thousand five hundred pounds to every square inch and at the same time heated it. The resultant coal was found to have acquired the same heating properties as stove coal. Similar experiments might be made with Irish peat, which, from its low percentage of carbon (sixty per cent), constitutes a very poor fuel.—*Commercial Intelligence*, July 4.

COW-TAIL HAIR.

Although peace has been declared, the good demand that has existed so long for cow-tail hair still continues, and though the high prices of 11d and 11½d per lb. realised two or three years back are no longer obtainable, nice long hair, well-washed and free of skin and bone, is valued today at 7d to 8d per lb. according to length and quality, at which price there seems little doubt it pays shippers, especially in India, to send over this article in large quantities. Pig's bristles are rather dull; owing to a large failure in the trade some time back the market was considerably upset, but is now recovering itself and Indian shippers are doing well with their consignments; at least those who are in good hands seem to be, as it requires a great deal of trade knowledge and patience to place out the consignments to best advantage.

RESTRICTION OF TEA OUTPUT:

MR. ACWORTH'S REPLY TO THE LONDON I. T. A. CIRCULAR.

Dear Sir,—I am in receipt of your letter No. 529, dated the 11th instant, with enclosure *re* restriction of output, Circular No. 37. I am not one of those who believe in artificial methods of improving the position in tea—I mean such methods as cessation of manufacture, destruction of low grades and so on, and cannot therefore consent to support the amended scheme in Circular No. 37. I am, however, prepared to do this:—(*a*.) I will undertake to hold back 10 per cent. of my outturn during the current year, not put it on any market, but store it in my factory till better times; or (*b*) I will hand it over to a Committee to be formed for the purpose of exploiting foreign markets. Either of the above will I do, provided that 135 millions of lb of the Indian tea crop consent to some sort of scheme for improving the position, either by cessation of manufacture destruction of lower grades, or whatever seems good to them. It seems to me that, should the Viceroy consent to a compulsory cess, and should growers agree to hand over 10 per cent of their outturn to such a Committee as I suggest, our position would be a strong one. We could use the cess entirely for bounties on green tea and for advertising, whilst we could follow up our advertisements with very cheap teas, so far as blacks are concerned. If we could only dispose of them at 3d per lb. it would suffice, for this would pay the grower for the leaf from the bush to the hands of the Committee, and would leave something in hand to cover freights and sale charges

If these freely-given blacks were placed very cheaply on foreign markets, such as Russia, where there is already a taste for and large trade in blacks, it would

help to confirm the taste, now in its infancy, for British-grown teas, and once acquired the taste would probably remain. Germany, too, offers, another field, where it would probably pay us to lay down very cheap blacks, particularly if it is true that tea is in future to be served out to the troops, and duty reduced to 1½d per lb. The taste, once acquired, will not be easily given up. The soldiers, when their period of service is over, returning to their families, will insist on having tea, will introduce it to their families, and thus the taste will grow and spread. It is by such means as the above that I consider we should extend the use of our produce. To subsidise shops in fashionable quarters of Paris and Rome is to my mind futile and a mere waste of money. We want to catch the masses, not the classes. Finally I think greens should be turned out by the million and not the 100,000 lb., and we naturally look to the North with its great Companies and large resources to show us the way. We are being beaten in the race by Ceylon, and there is no reason why we should be, if we get funds and use them judiciously.

I may mention here that we down here have been much disgusted by the refusal of the I T A in London to accept the offer of Mr. P C Larkin of Canada; indeed, we have lost all confidence in that Association. The suggestion to form a British Growers' Union is excellent, and will, I hope, be carried out in the near future.

As regards restriction of output, I have a word more to say. One scheme has been proposed which has not come before the public, and that is a scheme which has been suggested by Mr. Parker, the Chairman of our Association, which is contained in the following extract of a letter I have received :—"If artificial restrictions are to be imposed I wonder no one has thought * (perhaps he has, but I have not seen it) of giving the bushes an extra month's rest after pruning. It would do the bushes a lot of good and when the new shoots were cut or broken back to the required height, the tea made from the first flushes would be of decidedly superior quality to that made from ordinary 'tippings' and thus prevent a good deal of common tea being thrown on the market. The shortage too would be gradual all over Southern India and Ceylon and would be regulated by the date when different estates pruned their different fields, and would extend over a period of about two years. Being gradual, no one would feel the shortage very badly and the improved quality of the tea (by getting rid of the 'tippings') would probably fully compensate for a decreased quantity." I must repeat that I regard, artificial means of restriction with distrust, but this does seem the most sensible yet brought forwards provided you can get men to act on it. My private opinion is that you will never get men to act upon any artificial method."

The rest of the discussion on the Indian tea cess was conducted in Committee.—*M. Mail*, July 30.

CEYLON TEA IN THE UNITED STATES OF AMERICA.

The British Vice-Consul at Los Angelos, in his recent report, writes as follows :—"Heretofore coffee has been drunk here almost to the exclusion of tea. More tea is now being consumed, and as the quality leaves much to be desired, while the price is quite high, I should think when the demand increases pure Ceylon teas might be sold here to advantage. Several agencies for the sale of Ceylon teas have been established in the last 11 years and have not been successful, and the time is not yet ripe to press the sale of good teas. I think, however, that there will be a market here in the future."—*Board of Trade Journal*, July 10.

* [Some one has : it was suggested in the *Ceylon Observer* early in June by a correspondent, signing "Indo-Ceylon."—Ed. *T.A.*]

TROUT-FISHING IN CEYLON.

TWO DAYS AT THE HORTON PLAINS IN APRIL 1901.

(*Extracted from "Recollections of Sport" by James Cornway.*)

"I reach the river by 10 a.m. and find the water looking rather dark, owing to the rain of the previous night, but it is quite clear. I put on a small fly, black with red hackle, and some silver tinsel in the body. I know of a few places where trout used to lie last year, and approach carefully. Rainbow may be expected this year in addition to the brown, as the streams were fairly stocked with that variety during the last season. They must all, however, be returned to the water if I chance to take any. I had little expectation, however, of finding them in such numbers as they proved eventually to be. The first fish I caught was a rainbow, as nice a trout as could be wished for, measuring just twelve inches, and weighing about as many ounces; this may be considered very good growth for a fish only twelve months old. All I caught ranged from ten inches to twelve, and were in fine condition. Their fighting powers are too well-known to need my enlarging upon them; but I would sooner have a one-pound rainbow at the end of my line than a three-pound brown trout. He gives infinitely more play, and is decidedly more beautiful to look at. He almost invariably leaves the water three or four times before giving in; and then is a picture with the different lights on his body. The way, too, in which they come at the fly, leaves no doubt of their intention.

"After proceeding some distance without raising anything, I came to a large pool which I knew to harbour brown trout, but here again my first cast saw me into a rainbow. He was off like a rocket half-way across the pool, then he took a leap of seven or eight feet and was gone. He was a fine fish of some two pounds in weight. I caught three more in this pool, and returned them. The next fish I rose was a brown of about one and a half pounds. He came at my fly twice, but failed to lay hold. I gave him a rest, changed my fly, and tried him again, but he was not going to be caught this time.

"By three in the afternoon I had almost given up hope of catching a brown trout at all as at every pool I came to, and generally at the first cast, I rose and hooked a rainbow. This, of course, disturbed the whole pool, and I began to be provoked with them. By four o'clock, however, I seemed to have left rainbows behind, as I hooked and landed two browns, each about one pound in weight, within a few yards of each other.

"There had been thunder in the distance for some time, and, as it was coming nearer, I made off for the rest-house; and a rather sharp storm followed, the lightning being very vivid, and the rain falling in torrents. By five o'clock, however, it passed off, and I went out again; but the thunder had affected the fish, as I hardly got a rise, and they were evidently off their feed. As a rule, however, trout out here do not seem to mind thunder, probably for the reason that it thunders almost every afternoon, and they get

accustomed to it. I have fished through the whole of a severe storm, and caught numbers notwithstanding. On this occasion, however, I was using one of Hardy's cane rods, with a steel centre, and it was safer to lay it aside while the storm lasted. Just as it was getting dusk I had a rise, and as I watched a long stretch of water for some time they were rising again freely all over the water.

"I now put on a small 'coachman' fly, and fished till it became dark, but did not catch another fish. Those that were rising were apparently all small, and not worth taking.

"Sleeping at the rest-house, I next morning went down to the larger water about four miles below. By nine o'clock I had taken two trout of one pound and fourteen ounces respectively. Rainbows were again provokingly to the fore, and I returned several of about eleven inches. One I killed accidentally, it being badly hooked and injured. I held it in the water for some time, but it was beyond recovery. It had nice pink flesh, and proved very good eating. The brown trout seem to have here lost their pinkness of late years; and they further seem decreasing in numbers. The reason for this may be that the fresh-water shrimps have decreased; crabs, however, are still plentiful in all the streams, and, I think, are a great source of food. I have seen a trout taken with a crab in its mouth, too large for it to swallow, and yet he managed to take a fly. Another had a frog half-way down its throat, the hind legs protruding out of its mouth at right angles, and yet this one also was greedy enough to take a fly. My best fish was a beautifully-marked yellow trout of two pounds, five ounces. I saw it some way below me in the deep water, swimming aimlessly about, and managed to throw my fly just over its nose; it at once took it, and after some play I got it safely into the landing-net. It proved to be a very thick female, in fine condition.

"A little lower down in the same pool, which is a very large one, about fifty yards across and 200 yards long, I saw another large trout of about three pounds lying at the surface. Until I got closer, I could not make out what it was doing. It kept coming up, and taking the foam or bubbles which were floating down stream, making a noise each time with its mouth something like the word 'soup.' Thinking it might like something more substantial, I sent my fly above it, and drew it across almost close to his nose. The fly was immediately followed, but the fish failed to catch hold, and I could not induce him to come again. I landed another of about two and a half pounds in the next pool, with beautiful spots. He gave me some good sport, and I was decidedly pleased with my morning, so far.

"About mid-day I began to retrace my steps towards the rest-house. On passing the large pool, some way up the hillside, I looked to see if the big trout was still playing with bubbles, and, sure enough, there he was. I tried to get behind him for a cast, but he must have seen me coming, for he slowly sank and disappeared. I fished several likely places on my return walk, rose two nice fish, and hooked a third, which, however, managed to break away just as I was getting him near the landing-net. Above Baker's Falls, in a rocky pool, I secured my next fish, weighing about one and three-quarter pounds. At first I took it to be a rainbow, as he sprang out of the water several times, but he was too yellow, and, after a knock on the head, I found him to be a handsome golden fish with pink spots.

"By this time the afternoon thunder was rumbling, and as I had still two miles to walk, I started for the rest-house. I was caught, however, in one of the worst storms I would like to be out in. The roar of thunder was deafening, the lightning uncomfortably near, and the rain fell with a violence which threw up spray from the water to the height of a foot or more. On reaching the rest-house I weighed my catch, and found the eight trout weigh exactly eleven pounds, I had returned to the water twenty-one rainbow, and five brown trout of eleven inches and under.

"Next morning I make an early start for the station, rather more than two miles across patna, down through two miles of jungle, a short cut of the roughest kind. I reach the station just as the train steams into it; and two hours later I am at my bungalow ready for breakfast; and as I think over the doings of the last forty-eight hours, I come to the decision that a take of thirty-four trout amid such scenery, such air, and with such exercise, is a pleasure not to be despised, and would compare not badly with some of my sport at home in the Highlands." G. G. R. C.

PLANTING &c. IN THE MALAY STATES.

From the Annual Report for the year 1901 on the Federated Malay States by the Resident-General (W H Treacher, C.M.G.,) we make extracts:—

European COFFEE planters (Liberian) have again been disappointed by the poor prices ruling for that product, which were indeed lower than for the previous year—$18.29 per pikul against $20.89. Nevertheless, in Selangor and Negri Sembilan the European-owned estates are almost all in good order, there is a general improvement in the sample of coffee, and the planters are showing great determination to tide over the present long-continued crisis. The export of coffee for the year amounted to 51,239 pikuls as compared with 44,763 pikuls in 1900.

The reports as to the successful growth of Para and Rambong RUBBER are most encouraging and the cultivation of these species is being rapidly extended.

In Perak the cultivation of the SUGAR-CANE continues to prosper, flourish and extend, and, I am sorry to say, is in some places displacing padi, European and Chinese capitalists buying up padi land from the Malays, who, with some reluctance, part with their land, unable to resist the temptation of ready cash. The export of sugar from Perak amounted to pikuls 343,881, valued at $1,500,000. The figures for the preceding year were pikuls 278,156, value $1,315,974.

CENSUS IN THE MALAY STATES.—For the purposes of the Census the following areas were re-cognised, to which I have added the figures of population for the years 1891 and 1901, and the increase per cent:—

State	Area. Sq. mile.	Population. 1891.	1901.	Increase per cent.
Perak	6,500	214,254	329.665	53.87
Selangor	3,200	81,592	168,789	106.86
Negri Sembilan	2,600	65,219	96,028	47.23
Pahang	14,000	57,444	84,113	46.42
	26,300	418,509	678,595	62.14

It should be said that the figures of 1891 for Perak are considerably more reliable than those for the three other States. The total cost of the Census amounted to $60,500, or under 9 cents per head of population. Mr. Hare's report abounds with interesting deductions from the figures at his disposal. I must content myself with the following remarks. Principal nationalities, exclusive of floating population and prisoners :—

Malays and other Natives of the Archipelago	312,456	increase per cent	34.9
Europeans and Americans	1,422	do	98.3
Eurasians	1,522	do	169 8
Chinese	299,739	do	83.4
Indians	58,211	do	188.8
Average density of population per square mile			25.7

Population of five principal towns : — Perak : Taiping, 13,331 ; Ipoh, 12,791. Selangor : Kuala Lumpur, 32,381. Negri Sembilan : Seremban, 4,765. Pahang : Pekan, 1,142.

Chinese population of two British Colonies and the Federated Malay States :—

Hongkong and Kau Lung	..	376,797
Straits Settlements	..	281,933
Federated Malay States	...	299,739
Total	..	958,

It is stated that during the years 1881-1900, 1,681,711 Chinese immigrants have come to Perak and Selangor. It is, perhaps, unnecessary to point out that the attraction to the Chinese in the Federated Malay States is the tin mines, that not one quarter of the Chinese population can be considered to be "resident," and that the disproportion of the sexes amongst them is very marked —the proportion of Chinese males over 15 years of age to Chinese females per 1,000 is 927 males to 73 females ; the proportion of all Chinese males to all Chinese females per 1,000 is 910 males to 90 females.—*Mr. Treacher's Annual Report.*

SELANGOR EXPORTS.

Under the head of exports the principal increases are found under tin and tin-ore, mangrove-bark, charcoal, firewood, coffee and copra. It is to be regretted that, with an increase of nearly 3,500 pikuls in the amount of coffee exported, the value owing to the low prices ruling during the greater part of the year, was less than in 1900. The quantity of copra exported (5,544 pikuls), though not very large, was more than double the amount exported in 1900. The price of this product has been steadily rising since the end of 1900, and with the increased attention which is now being devoted to coconut growing copra should, before long, be one of the staple exports of the State. The principal decreases are to be found under ataps (the export of which was only about half that recorded in 1900), getah, betel nuts, gambier, blachan and salt fish. The value of the gold exported from Pahang *via* Selangor rose from $366,369 in 1900 to $400,960 in 1901.

THE PRODUCTION OF HEMP IN THE PHILIPPINE ISLANDS.

The principal industry of the Philippine Islands is the production of hemp. The southern part of Luzon Island, and all other islands to the south, are given up largely to hemp cultivation, all of the product being shipped to other countries to be manufactured. It is the industry which supports a large proportion of the population of those islands where it is extensively grown, and, according to the opinion of those most familiar with the trade, there is no danger of any over-production and a consequent decrease in the selling price of this product ; at least so it is stated in an official report on the trade of the Philippines recently issued by the United States War Department at Washington. Manila hemp is used in the manufacture of cordage of a superior class. For ships' purposes it is superior to any other material, considering its cost and wearing qualities. The cultivation of hemp, while carried on extensively in the Philippine Islands, is conducted in a most primitive manner. It is found nowhere else in the world, and while it is now extensively cultivated, and large tracts of land are planted with it ; it is still found growing wild in certain portions of the island, and in quantities which make it worth while to gather it for shipment. Hemp, or "abaca" as it is called in the Philippines, is a product of a species of plantain tree. In its wild state it grows to a height of from eight to twelve feet, but under cultivation it grows to a height of from fifteen to twenty feet, with a trunk from eight to twelve inches in diameter. The stalk of this tree is in appearance something like the banana plant—merely a collection of fibrous leaves, which are closely joined together, and which can be easily cut with a single blow of a sharp knife. The tree is allowed to mature, which requires about three years, this being dependent upon the soil and the elevation of the land upon which it is planted above sea level. When the tree has attained the proper age, it is cut down and divided into long strips which are put under a large knife, weighted with a lever, and under which the strips are drawn. This separates the stalk and juice from the fibre, and the latter is then spread out on the ground to dry. This work is all done at the plantations, and after the abaca or hemp is sufficiently dried it is gathered up and taken in bullock carts to the nearest waterway, and shipped to some port where it is made into bales ready for export. The production of hemp is carried on extensively by natives, by Spaniards, and by foreigners. The export business is practically all in the hands of foreigners—mostly English, Belgian, and German houses.—*Journal of the Society of Arts*, June 27.

VANILLA CULTIVATION IN SEYCHELLES AND CEYLON.

The following remarks by a well-known planter will be read with interest :—" I have read the memorandum issued from Seychelles Government House. The cost of land in the Seychelles is very high R300 per acre. There is land suitable for such cultivation,—viz., cacao, vanilla, and should include rubber—in the Matale and Dumbara Valleys, available at R60 per acre. The cost of labour is also dearer than in Ceylon. The cost of curing R1·25 per lb. about the same as in Ceylon. As Vanilla grows very well on Dadaps, it is just as well to have these trees cultivated along with cacao. The Seychelles' produce is probably superior to that of Ceylon : in fact, I believe, it to be the best vanilla produced. Five rupees per lb is about as much as can be obtained at the present time for good Ceylon Vanilla on the spot. I find that Vanillas

frequently *commence* to bear at *2 years*. Each vine the memo states can produce from 25 to 30 pods, 4 inches to 8 inches long. This is surely a very moderate yield. I have frequently counted 70 to 80 pods or more on a single vine and well up to the measurement noted."

IMPROVED CEYLON GREEN TEAS.

We were enabled a few weeks ago to send the well-known Indian tea authority Mr. J. B. Leslie Rogers, a few samples of the teas turned out by Ambawatte mills, Colombo, and we are pleased to give his report on the same as of general interest:—

I have just been testing these samples, and the following is my opinion on the same. I may add that as I have more experience of the Asiatic than the American Green Tea Market, my opinions chiefly apply to the former.

No. 5 Samples.—Good Hyson quality. Rather broken leaf colour bluish Green and slightly uneven. Aroma good.

No. 6 Samples.—Good Young Hyson quality. Leaf fine and well rolled, but rather broken. Colour bluish green, but of a more desirable shade than No. 5. Aroma very good.

INFUSION.

No. 5.—Infused leaf, a good olive green. Pale straw green liquor, strong, crisp and full-flavoured. Fresh delicate aroma. Good in the cup.

No. 6.—A good even olive green. Liquor—a pale straw green. Strong, crisp and more delicately flavoured than No. 5. Fresh delicate aroma and very good in the cup.

General Remarks.—Both high-class teas, which compare very favourably with the same qualities made in China and Japan. They would, however, in my opinion, be much improved if turned out a lighter green colour with less of the blueish tint. I would also suggest sifting out more of the small broken leaf, and disposing of the latter separately.

Messrs. Finlay, Muir & Co. are to be congratulated on these favourable samples. Similar makes with the improvements suggested, would undoubtedly "catch on" in the Asiatic Markets; and I also believe these teas will compete more successfully against Japans in America, than the other so-called Green Teas now being made in India and Ceylon. My views on this matter coincide entirely with the policy now being pursued by Messrs. Finlay, Muir & Co.; and I shall look forward with much interest to a successful termination to their important experiments in this direction.

SALE OF CEYLON ORCHIDS IN COLOMBO.

There was quite a lively time at the sale of Mr. Dodwell Browne's orchids by Mr. A. Y. Daniel this morning. Some 250 specimens were offered in about 100 lots, and the total realised was about R1,000. The highest price realised was R36 for the giant orchid, purchased by Mr. Macmillan, Curator of the Botanic Gardens, for the Lieut.-Governor. His Excellency, indeed, secured quite a number of rare specimens.

Amongst those present were: the Hon Messrs H L Wendt and J H de Saram, Messrs F Dornhorst, Morgan de Saram, S P Hayley, P D Siebel, R Daniel, Gigg, Geo. de Saram, Charles Perera, H F MacMillan, A W Andree, C Drieberg, Dr A J Chalmers and others. Amongst the purchasers, many of whom bought several lots, were Messrs J H de Saram, MacMillan, S P Hayley, G de Saram, M de Saram, F J de Saram, Gigg S D Young, R Daniel, J H E Rodrigo, Chas Perera, P D Siebel and Dr Chalmers. The prices paid ranged from R5 to R36. Mr. MacMillan bought one *Sarcochilus Calceolus* (fragrant flowers) for R36 and also a *Grammatophyllum Speciosum*, described as the queen of orchids, for R33. Mr J H de Saram bought a pretty *Sac Blumei* (lately flowered, eight blooms) for R34, two *V. Suavis* and two *V. Sauderiana* going to Messrs P D Siebel and Geo. de Saram for R20 each.

FLORA OF THE MALAY PENINSULA.

The Asiatic Society of Bengal has received R8,750 from the Government of the Straits Settlements, being a contribution for the purpose of defraying the cost of publication of Sir George King's materials for a treatise on the Flora of the Malayan Peninsula.—*M. Mail*, July 22.

BRAZIL COFFEE CROP.

There are 659,960,060 coffee trees in the State of Sao Paulo, Brazil, of which 525,624,435 are over four years old. During the present season the yield is on an average of 2 6-10 pounds net per tree. On some plantations with fully-matured trees, the yield has been as much as 12 to 14 pounds per tree. In commenting on the official returns of the coffee plantations, Messrs W H Crossman and Brother say:—"The State of Sao Paulo alone is capable of producing sufficient coffee to meet the entire consumption of the world; the fact that such a great quantity of trees exist, and such a large percentage of them below the age of four (4) years, proves conclusively that the planting has been going on successively during all the years, when it was proclaimed low prices meant heavy losses to planters, and that there was not sufficient labour to care for the plantations. It was claimed there were not enough hands to harvest a crop of nine million bags, and the Italians were leaving the country in great numbers; yet what do we see? Rio and Santos alone in one season are able to harvest a crop of upwards of fifteen millions, and have found time to continue clearing and extending plantations up to and including this very year.

It makes very little difference, in view of the monstrous supplies existing, whether the next crop is nine, ten, eleven or twelve millions. Any one of these quantities is much in excess of what is really wanted.—*Indian Gardening and Planting*, July 24.

Coconuts and White Ants at Zanzibar.—Mr Theodore Burtt of the "Friends' Industrial Mission," Zanzibar, writing from Pemba on 2nd July, reports:—

"*Re* white ants and young coconuts. Some time ago I removed the soil from the upper part of some hundreds of young plants in the nursery, and put wet sand straight from the shore in place of the soil close round the nuts and young shoots. For some weeks the white ants let them alone entirely. Today I see three have been eaten off. I will soak them with sea water and hope to let you know the result after a while."

AN ENGLISH RUBBER PLANTATION IN MEXICO.

While most of the interest in rubber planting in Mexico has been developed with capital from the United States, and principally under the control of large companies, there are some plantations privately owned by citizens of other countries. One, for instance, is that above mentioned, the property of George Cullen Pearson of England. In a statement from the manager of this plantation to *The India Rubber World*, under date of May 20, it appears that there are now growing on this property fifty thousand rubber trees *(Castilloa elastica)* which were four years old in June; one hundred thousand trees three years old; and two hundred thousand trees two years old; besides a large number of plants in nurseries. This plantation, by the way, is one which has been referred to in certain quarters —but not on the authority of the owner—as embracing a large number of rubber trees old enough to be tapped this year.——Mr Pearson's plantation is located two miles from the "Hacienda de Yale," owned by Alfred Bishop Mason, of Chicago, and president of the Vera Cruz and Pacific Railway Co. Mr Mason's two nephews, James Trowbridge and R Willis, are resident managers of this hacienda, on which a considerable amount of rubber planting has been done.—*India Rubber World.*

A CHINESE CAMPHOR MONOPOLY.

On the authority of the Japanese Foreign Office, it is now stated that the Chinese Government has decided to establish a Camphor Monopoly Office in Fohkien, placing the manufacture and sale of camphor under the control of the Japanese. It is not correct, however, to say that the monopoly right of the camphor trade is to be conceded to the Japanese Government. In future the Japanese may be a party to the camphor business by contributing a part of the expenses of monopoly, but no definite arrangements have yet been made.—*Hongkong Press*, July 19th.

THE RUBBER FAMINE!

One of the subjects which might well occupy the attention of the much-talked-of colonial conference, which is to take place in Coronation week, is the rubber famine in West Africa. I hear from sources which are absolutely indisputable that rubber is becoming scarcer every day. The reason for this is not far to seek. In the first days of the rubber boom eager speculators rushed to West Africa, caring little what they did as long as they got rubber. As a consequence, the rubber trees were destroyed in a manner enough to make the heart of the most amateurish woodman sick with anguish. On the principle that you cannot eat your cake and have it, rubber—at least, the West African species—will soon become as rare as the Great Auk.—*Today.*

THE TROUBLES OF COCONUT PLANTERS IN THE STRAITS.

We are sorry to learn that another enemy to coconut planters has turned up in the *tikus besar*, that is so destructive also to padi crops. The "Mongoose" is their best destroyer, the introduction of which may prove beneficial. These creatures also keep a place remarkably free from snakes.—*Perak Pioneer*, July 29.

"HEMILEIA VASTATRIX" IN THE FRENCH COLONIES.

The French Minister for the Colonies has taken precautions against the hemileia vastatrix, a fungus which fastens on the leaves of coffee plants and destroys them. It is for the coffee planter what the phylloxera is for the vine-grower, and has played havoc in Ceylon. The French Colonies of Martinique, New Caledonia, Reunion, Madagascar, Guiana, and the Congo as well as Cochin China and Tongking raise much coffee, and it is now forbidden there to import coffee plants. Even coffee beans must be immersed for half an hour in a 1 per cent. solution of sulphate of copper to kill the enemy.——*Globe*, July 18.

JAPAN TEA IN 1901.

YOKOHAMA CONSULAR REPORT.

District of Yokohama, 1901, by Mr Consul H A Bonar.—The raw tea season opened at the end of April with but little animation, and although the demand increased as prices steadied, the competition for early teas, which in former years was always a marked feature of the trade, was anything but brisk, and the inquiry continued slack until the end of July. The fact cannot be denied that the Japan tea trade is gradually contracting in volume, the annual export of the United States and Canada having fallen off by some 10,000,000 lb. during the last 10 years. The competition from India and Ceylon teas has not proved as dangerous as was expected last year. The efforts made by these growers have not met with much success in the United States, and it is now doubtful if they will ever make any serious inroads into the trade. In Canada, however, the Japan tea trade is certainly suffering from the competition of these teas and it is probable that, except in the lower grades of Japanese, used chiefly for mixing purposes, the Ceylon product will eventually supplant the Japanese growths. The total export from Yokohama in 1901 was 24,577,524 lb.—*L. and C. Express*, July 18.

TAMIL EMIGRANTS AND THEIR FOOD.

(*To the Editor, "Madras Mail."*)

SOME USEFUL NOTES.

Sir,—Dr. Haviland, of Perak, attributes the prevalence of dysentery among Tamil coolies from India to the full meals they get on the estate. It has been observed in the hospitals in the planting Districts in Ceylon that a meat diet does not suit the cooly patients. They do not recover health or strength by it. This proves the rule that one man's meat is another man's poison. What is good and wholesome for the hardier Chinese cooly may not be so for the Tamil cooly who is "transplanted" to a strange country where he has to face a different set of circumstances. A sudden change from the arid plains of the Carnatic to the wet regions of the Malay Peninsula might in itself cause diarrhœa and dysentery. Overloading the stomach with food-stuffs to which one's system is not used may be another. But to say that dysentery follows good food is a startling statement. A full meal of rice and milk and vegetable curries will not lead to diarrhœa. But when the Tamil cooly imitates the Chinese cooly in eating

anything and everything at any time in a new place, he must necessarily get ill. There is nothing new in the case of the Tamil cooly catching diarrhœa or dysentery when he changes his diet. Without going far afield I may instance the case of the Tamil cooly in the Wynaad District when he is supplied with "raw rice." The Canarese cooly thrives on "raw rice" because that forms his ordinary food. But the Tamil cooly who is not accustomed to it gets diarrhœa when he lives on raw rice. The ordinary diet of the Tamil cooly in the high lands of Ceylon consists of rice, dhall and small dry fish called *nettali*. It has been found by experience that *nettali* soup nourishes the cooly patient, whereas mutton or chicken broth does not, because he has not been used to it. This does not apply to all coolies. There are some who are robust and well-fed like the Kanganies and the cooly employed in the planter's bungalow. The causes that lead to ill-health of the Indian cooly on landing at Perak are the following :—(1) the fatigue and starvation he has undergone on the sea voyage ; (2) the change of climate which includes the "bad water of Perak"; (3) unwholesome food, such as eating plenty of plantains and other fruits and meat at irregular hours.

M. TISAINAYAGAM.

Kayts, Ceylon, 24th July.

PANTING NOTES.

TEA BOXES FOR THE CANADIAN MARKET. —We attract attention to "Merchant"'s letter on this subject, on page 200 as giving practical information of interest to shippers of Ceylon tea for Canada.

PLANTING IN SUMATRA.—Our planting readers will enjoy the racy letter we print on another page above the well-known signature of "W. T. McK." "Well-known" in Ceylon twelve or twenty years ago—but, alas, how many have come and gone since then !—and we fear if Mr. Turing Mackenzie revisited his old diggings in the Central Province, he would feel like a stranger among strangers, so far as his personal surroundings were concerned, although he would have a hearty welcome both from old and new. But the country is much the same, and his German or Dutch friend does not overrate the beauties of our Central Capital, uniquely situated in its cuplike valley guarded by the hills and the river, and with the grand Peradeniya Gardens close by. Someone the other day asked us "what about the future of Coffee?" The question made us feel a little guilty ; for, in 1896, we ventured in a letter to the London *Times*, which appeared above our own name, to correct some remarks of Sir R W Herbert and to say that "coffee" (with the failures in Ceylon, Java and India) should be *the* product to go in for, where it would grow in the tropics. Alas ! we had then no conception of what Brazil could do in almost doubling its exports. For the outlook at present, we cannot do better than refer to what "W T McK" says on another page. —As to the "King" coconuts wanted, we have no doubt some one with a good garden and wishful for new plants, will respond.

NORTH BORNEO.—We have had enquiries lately as to progress in British North Borneo. Such figures as the B.N.B. Company's Agent sends us (see page six), are the briefest answer and index to the growth of the country.

"HILL" FLAVOUR IN TEA.—The depressed spirits of planters are beginning to revive (says the *Indian Planters' Gazette*, August 2nd) especially those in Darjeeling, who almost began to think that the manufacture of teas of true "hill" flavour was a "lost art." Some of the gardens in the Darjeeling district have realised very satisfactory average prices for late invoices. Really good hill tea will always command full value, the same as any other "stand out" tea.

A NEW CURE FOR DYSENTERY.—We are always glad to hear of new and authentic cures. Have any of our readers information on the drug referred to in the following Indian cutting? :—"The ravages which dysentery caused among Europeans in the tropics before the disease was as well understood as at present were terrible, and now, although it is affirmed by many medical men that dysentery if taken in hand in time is practically always amenable to treatment, and but seldom fatal even when for a short time neglected, yet the number of deaths caused by it, especially among children, is still very great ; and it is most certainly good news to hear that a new cure for it has been discovered in the seeds of the "Brucca Sumatranœ," which are said to be as much a specific for it as quinine is for malaria. Now that is news to the greater part of the world although probably known for long by the natives of the regions in which it grows. It is even found in Borneo, Java, Sumatra, the Philippines, South China and Australia. The plant is being raised from seed and in a short time the seedling will be ready for distribution, and already there have been very many applications received by Mr H M Ridley, the Director of the Botanical Gardens of the Straits Settlements."

BANANA RUBBER.—Substitutes for india-rubber appear to be getting more and more numerous. The latest idea is certainly the best ! As recorded in the pages of "The Fruit Grower," the information must be of great value to its readers as well as to the manufacturing trade ! The writer introduces his subject as follows :—There have been for many years past attempts to provide a substitute for rubber, the market price of which has in the past decade gone up by leaps and bounds. There is even talk at times of the supplies giving out. According to a report recently received in this country, a method has been patented for perfecting the manufacture of an artificial india-rubber from banana fruit skins, and a company is to be formed to work the process. Small cuttings of sheet rubber made a percentage of "banana rubber" and Para rubber have been exhibited in this country, and it is said to be difficult to tell the difference between this combination and pure rubber. It is claimed that banana rubber can be made at about half the price of pure Para rubber. When the skins of the banana (used according to this process) are *proved* to be worth more than the fruit itself, an enormous impetus will, of course, be given to the transport of bananas from West Africa and other parts of the world, where this fruit is so prolific. It is said that Messrs. Rowntree & Company, of York, who own large estates in the West Indies, are making exhaustive experiments in the manufacture of banana rubber.—*India-Rubber & Trades Journal*.

PLANTAIN-MEAL.

(To the Editor *Madras Mail.*)

SIR,—The green plantain, as you know, perhaps, forms a large item in the diet of the Hindus. Dressed, in various ways, it is not only palatable but highly nutritious, in which respect it is only inferior, if it is inferior, to the potato. Of late a good deal of attention has been drawn to plantain meal, and I presume that my personal experience in this respect may not be uninteresting. I use the meal a good deal in my family as a substitute for the flours of pulses, which, though possessing dietetic advantages, are not so digestible as plantain-meal. The way to prepare it is this. Pare the plantains, taking care to remove only the skin; then cut them into thin slices, which, after being dried in the sun for some days in boxes covered over with muslin, should be pounded fine in a mortar and the flour resulting be passed through a fine sieve, which will give a fine silky powder which should be put up in airtight tins or close-corked bottles to keep out the damp, to which it is extremely susceptible. My children all thrive upon it, and an infant of delicate constitution became after a conjee made from it quite strong, gaining flesh rapidly. I think that in this meal is to be found a new industry which if worked with care and persistence, will yield considerable profit. There are all kinds of English foods in the market, but these being priced too high are beyond the reach of the poorer classes who would be glad of something nearly as good at a lower price. I throw out the hint, hoping to see it taken up by someone who cares to put his hand to a new venture. I am almost certain, judging from my experience, that he will not repent it.

V. KRISHNASWAMY MUDALIYAR.

☞ One of the latest Reports on Plantain Meal is that of M. de Jong, of Surabaya, Java. He states that it is impossible to find a market for it in Europe. A big factory for making Plantain Meal according to the best methods was constructed in Java some years ago and recently went bankrupt. M. de Jong explains that very many attempts have been made to make a European market for Plantain Meal, especially as a food for infants; but in vain. The explanation given is that Plantain Meal is too rich in starch, which cannot be easily digested by infants. Nor can plantains be exploited for the starch itself, he adds, because of its dirty grey colour, which no chemical can get rid of.—Aug. 2nd.—ED.

PIERMONT MORGAN'S STAR SAPPHIRE.

LARGEST IN THE WORLD.

Mr Piermont Morgan has sent to the American Museum of Natural History in New York a star sapphire which is believed to be the largest in the world, and a yellow sapphire which is regarded as the most beautiful in existence. These gems will be added to the collection of precious stones previously presented by Mr. Piermont Morgan to the museum. This collection was shown at the last Paris Exhibition.—London *Times*, July 16.

THE "DJAGAGIRI" CINCHONA COMPANY, of Java, have declared a dividend of twelve per cent for 1901, the net profit being 33,533fl (about £2,800). The retiring director, Mr J R de Jong, was unanimously re-elected.—*Chemist and Druggist*, July 19.

RUBBER;—A CHOICE DESCRIPTION!

The crude rubber, as shipped by the natives, is known commercially as "rubber hams," the shape being almost identical with that of a good Yorkshire. Germany has commandeered nearly the whole of the rubber business, and the big German companies control the shipment of rubber in nearly every part of the world. The first thing, when a rubber ham comes to a factory, is to split it open. Natives have a wily trick of "stuffing" the ham with stones or metal to increase its weight. A sea voyage causes the rubber to lose weight, and the man who deals in the raw material has to make good the loss resulting from exposure to air. After the ham is cut and inspected, it is put into a crusher and ground out of all recognition. The next evolutionary stage is the washer, where all dirt, stray leaves, and impurity are cleaned out. It emerges from the washer in knobby rough sheets. The length of time it remains in the drying room depends entirely on the use to which it is to be put. "Compounding" is the next stage, sulphur being used to cure the rubber.

Immense care and skill is necessary in the compounding of rubber for tyres. Pure rubber would tear into ribbons with the wear and tear of the roads. When the necessary "compound" is decided upon, and the ingredients added, the whole is put in the mixing rolls. One roll runs quicker than the other, so that the twisting thus caused thoroughly mixes the compound with the rubber that is to form the tyre.—*Motoring Illu trated.*

PLUMBAGO MINING IN KALUTARA DISTRICT.

(*From Administration Report for 1901.*)

The price of plumbago, which fell heavily early in 1900, remained low in 1901 but rose slightly towards the end of the year. Few pits were opened; many were closed. In October only 36 pits were being worked, as compared with 94 a year before. They were distributed as follows:—Pasdun Korale East 27, Pasdun Korale West 6, Rayigam Korale 3,—Total 36. Of this total 31 are situated on land alienated by the Crown, 3 on land leased by the Crown, and 2 on paraveni land. By the end of the year 14 out of the 27 pits in Pasdun korale east had been closed. The number of mining declarations received at the Kachcheri fell from 204 in 1900 to 45 in 1901, of which 35 were for land in Pasdun korale east.

Messrs. Skrine & Co., on behalf of Messrs. Reckitt & Sons, Limited, were working during the year the three mines situated on land leased by the Government, viz., Humbuluwa at Liniyawa and Kokkumbura and Nakaulketiya at Migahatenna. By the courtesy of Messrs. Skrine & Co. I am able to append the following observations made by Mr Gill, the Manager of the Mines, on their operations:—

The work of developing the mines has progressed steadily during the year, and satisfactory results have been obtained. No new shafts have been sunk, but those already in existence have been considerably deepened. The system of work carried on under the previous management has been abandoned, and all operations are carried on in accordance with modern European methods. The native workmen have, on the whole, taken kindly to the system adopted, and a number of them are becoming expert in the English methods of sinking, driving, stopping, and timbering. The system of twelve hours' work instead of twenty-four introduced during the previous year has been adhered to, better work being got out of the men in the twelve hours' shift system. During the past few months, by the order of the directors, only necessary work, such as timbering, has been done

during the day shift on Sunday. The plant of the mines has been considerably augmented duiing the year, and hand labour for raising plumbago, *debris*, or water entirely superseded by steam machinery. Winding plants are working at Kokkumbura and Nakaulketiya; a new winding engine is in course of erection at Humbuluwa, and the mines are kept free of water by five powerful steam pumping engines. A light tramway has been laid down at Kokkumbura and another at the Nakaulketiya mine for the removal of *debris*. The timber for the workings is obtained locally, alubo and hora having been decided on as the most suitable woods. A dynamite store has been constructed in accordance with the published regulations, new cooly lines put up, and a good bungalow erected at Kokkumbura. A freedom from accidents of a serious nature has been enjoyed, and the labour force of about 200 men resident on the mines is contented and fairly stationary. The speed at which the mining operations are carried out is steadily increasing, and considerable new developments are projected for the immediate future.

INDIARUBBER IN NEW GUINEA.

Melbourne, July 18.—A discovery, which may lead to the more rapid development of British New Guinea, has been reported to the Acting Prime Minister. The British Ambassador at Berlin has advertised Rp. Deakin, through the Colonial Office, that guttapercha and Indiarubber have been found near to Stephensort, in German New Guinea, by Capt. Schlecter, who has just returned from an exploring expedition. It has long been thought that guttapercha is to be found in British territory, and now that the Germans have discovered its presence on their division of the island, more attention is likely to be given to the establishment of an export trade of the commodities named by the English settlers.—*Adelaide Observer.*

A RUBBER SUBSTITUTE.

New York, July 19.—As the results of a series of tests which have been made for several months, it has been found possible to manufacture from Beaumont oil a perfect substitute for high grade rubber. A company has been formed with a capital of £200,000 to use the discovery commercially.—*Laffan.*

TEA: THE WORLD'S PRODUCTION AND CONSUMPTION.

The two special points which strike us in the diagram circular of Messrs. Gow, Wilson & Stanton, which we issued with our last issue of the *T.A.*, are the danger pointed out of China common teas coming back into competition with British-grown teas; and the advantage of and necessity for making as much of green tea as is possible both in Ceylon and India. The diagrams and letterpress are otherwise both interesting and instructive. We send them to all who get our blue tea circular. Another striking fact as shown in the diagram on the last page of the circular is how tea consumption in the United States has gone back from a total of 117 million lb. in 1895 to only 108 millions in 1900; while Russia and Germany have advanced in the same period from 98 to 132 millions. Clearly the latter, which still take 112 million lb. of China against only 20 of British-grown tea, are the countries to be specially exploited for the ousting of China. The progress made in the United States with British-grown tea in the five years ooks poor, compared with similar progress in Australasia, for instance; and the field for superseding "Chinas and Japans" is here also very considerable. Indeed the fact that China, Japan and Java should, in 1900, make no less than 253,605,914 lb. of the world's consumption, against 313,147,698 lb for India and Ceylon, shows that the "Far East" tea trade is by no means extinct and that not Over-production but *Supersession* must be the order of the day. To that end, the cheapness of British-grown teas at this time may be a blessing in disguise; for it ought surely to secure an increased demand for such teas on the Continent of Europe and North and South America. The last is not to be despised, for it takes over 4 millions of China tea; while Australasia still has 7 million of the same description, South Africa 1½ million and "Other Countries" 5¼ million lb. Altogether there is plenty of room to fight the battle with China and Japan.

BOERS AND CEYLONESE IN EAST AFRICA.

A number of Boer families have been introduced into German East Africa, to pursue stock raising and Agriculture on the high plateaux. The "Berliner Tageblatt" states that about 30 Ceylonese families have also been introduced for rice-grows ing in the low-lying regions, while great effort- are being made to extend the area of coffee-planting. Coffee, too, is making headway and there are about 50 miles of railway open.—*Globe*, July 25.

The "Prickly Pear" Cactus—makes a good fence, and was formerly used for the purpose by the mission fathers of California. Rabbits and other burrowing animals also seek their protection for warrens. Many birds build in the same refuge from their enemies. The giant "candle cactus", resembling a huge candelabra and covered with spines, is perforated by the Gila woodpecker, which, after making a hollow in the pith from 12 to 30 feet above the ground, builds its nest there.—*Globe*, July 25.

African Coffee.—The coffee, known as the Highland Coffee of Sierra Leone, was introduced to the West Indies about six years ago, through the instrumentality of the Royal Gardens, Kew. It is quite distinct from either Arabian or Liberian coffee, and is admirably suited for cultivation from sea-level up to an elevation of about 800 feet. The botanical name (*Coffea stenophylla*), that is "narrowed-leaved coffee," is a good name, as by this character and its small, dark-purple berries, it is readily distinguished from all other coffee. "Stenophylla" coffee has nowhere been more successful than under Mr Hart's care at the Royal Botanic Gardens at Trinidad. It has grown there into tall, handsome bushes, ten to twelve feet high, loaded with berries. It is singular that it has shown a marked tendeney to be cross-fertilised by Liberian coffee, so that in the second or third generation its original characters have almost entirely disappeared. If this coffee is desired to be kept distinct it must therefore be cultivated away from other coffee plants.—*Barbados Agricultural News*, July 1.

THE PEARL FISHERIES OF CEYLON: PROFESSOR HERDMAN'S REPORT: GOOD PROSPECT OF CONTINUOUS FISHERIES IF SCIENTIFICALLY TREATED:

TWO DANGERS TO AVOID:—"OVERCROWDING" AND "OVERFISHING."

No act of Governor Sir West Ridgeway is more likely to be fruitful in material advantage to this Colony, than the selection of Professor Herdman, F.R.S., to inspect and report on its Pearl oysters and Fisheries. We had in 1896 seen something of Dr. Herdman's work in the Isle of Man where he had established a Marine Laboratory which was an object of much interest to the Zoological section of the British Association meeting that year in Liverpool—one that included a special scientific excursion to the neighbouring island which Sir West had administered until 1895 when he left for Ceylon. We felt sure the right man was coming to deal with the problem of our Pearl Fisheries as soon as we heard of Dr. Herdman's appointment. The result, to judge by the Report, which we issued as a special supplement last evening, more than justifies the most sanguine expectations. Indeed, the regret must now be that Professor Herdman was not called in ten years earlier. But the fact was that "science" had got discredited, both in official and unofficial circles in Ceylon, ever since the failure of Mr. Holdsworth's mission in the time of Sir Hercules Robinson. That energetic Governor, when he found that—instead of four or five successive annual fisheries beginning with 1863 as anticipated by the then Inspector (and Collector of Customs), the Hon. Geo. Vane—there were no oysters available after the first harvest (which yielded R510,000 of revenue), resolved to call in the aid of science to see what could be done. Mr. Holdsworth, a Fellow of the Zoological Society of some experience in connection with home fisheries, was selected, but he met with most unfortunate circumstances during his few years in Ceylon; for not only did he never see a fishery but there was no bank covered with young oysters for him to examine or experiment with. From 1863 to 1873 proved a complete blank in our Pearl Oyster annals and Mr. Holdsworth left us none the wiser, so far as any practical result was concerned, though his Reports in themselves afforded in their way interesting reading. Very different is Professor Herdman's experience. He came to us not immediately after a successful fishery (such as occurred in 1891, giving R963,749 of revenue) but at the *close* of another decade of blanks and just when our historic Banks had once again become covered with enormous deposits of oysters, estimated for one bank alone at over a hundred thousand million! And not only young oysters; but in the case of one or two Banks a great many of an age that all past experience shows should be fished "next year," lest they may slip away or be lost—from one or other of the several causes which have disappointed our hopes in the past. In his Report Professor Herdman does not enter into the history or causes of past failures.—For the present at least, he wisely leaves alone a discussion of the reasons for the periodic succession of a series of years with fisheries alternating with a series of blanks On that subject he may possibly enter later on. But while going at once to the work before him, and giving us the results of his observations and scientific knowledge, he indicates two dangers apparent to the biologist in connection with such Fisheries, which may very likely indicate the key to much that is mysterious in the past,—namely the dangers of *overcrowding* and *overfishing.* The former especially is very evident at the present time (as it was to Sir William Twynam and Captain Donnan in 1862, in 1879 and in 1889); but—for the first time, we believe, in the whole history of Ceylon Pearl Fisheries—is a practical remedy proposed, namely that of *thinning out and transplanting the young oysters.* This, Professor Herdman assures us, can be easily and speedily done on a large scale by dredging from a steamer at the proper time of year, when the young oysters are at the best age for transplanting. Here is the one specially valuable result, so far, of Professor Herdman's Mission; and if he and his Scientific Assistant, Mr. Hornell, are enabled to carry out successfully the remedy herein proposed, we say they will most amply justify Governor Ridgeway's step in securing their appointment and be the means of conferring an immense advantage on the island by turning its Pearl Oyster Fisheries from an entirely uncertain, intermittent source, to a comparatively permanent source of revenue. Of the other work, of the two scientists, we need only notice the selection of Galle Harbour as the site of a Marine Biological Laboratory, and here the necessary experiments are now being carried on by Mr. Hornell, which are to determine the best size of oyster to transplant, the right season of the year (October or March) for the operation, and whether only oysters attached to movable objects can be depended on, or whether the byssus, once dredged or torn away, can be replaced without injury to the oyster.

We must not, of course, be too sanguine as to the future. The warnings of the past, ever since Sir Henry Ward's day, are sufficient to teach caution. We must first see actual transplanting on a considerable scale successfully carried out, and still more a successful fishery from the bank so planted, as well as a proper harvest gathered from the bank relieved of the superfluous bivalves. In all this there will be a risk; but Professor Herdman's modest, albeit clear and practical, statements inspire confidence, and we hail his Report as both extremely satisfactory and encouraging to the Government and public of this Colony.

VIEWS OF A MANAOS RUBBER MERCHANT.

During a recent visit to New York of Mr N H Witt, a leading rubber merchant of Manáos, the rubber centre of the upper Amazon, he was asked by "The India Rubber World" for his views on the practicability of companies being organised to work on a large scale in the movement of rubber direct from the producing districts to the consuming markets.

"I do not believe that such a thing can be done as yet," said he. "The difficulty of the labour problem is an old story which continues to be repeated. In the Amazon valley all the labour must be imported, together with provisions.

"There are no European peoples who can stand working in the climate of the Amazon valley. Something might be done with coolies, but it is a difficult matter to arrange with the government of British India for their introduction into South America. There has been talk of importing Chinese, but they would likely all turn traders and desert the rubber camps.

"I am convinced, therefore, that for a good while to come the safest way to deal in rubber is through the establishment of trading houses at the principal centres, as at present, and buying such rubber as may reach the market, from whatever source."

In answer to a question as to whether the existing rubber fields on the Amazon were showing indications of becoming exhausted, Mr Witt said :

All the fields which yield rubber other than Caucho still seem to produce the usual output. It is probable, however, that in some districts on the lower Amazon the trees have ceased to yield, and the fact that more rubber has been shipped this season from the state of Pará than last season may be due to the fact that the rubber workers have gone into new territory. In some cases the men may have worked harder, as we call it, forced by the low rubber prices ruling now. The increasing total production of the Amazon valley is due, of course, to the general widening of the district gone over in the search for rubber.

"One thing which indicates that the trees in the districts which have longest been worked are becoming less productive is the fact that the rate of shrinkage in the Island's rubber received at Pará gradually becomes greater. I remember that in 1885 a shrinkage of 6 per cent. was expected in Islands rubber, and the rate has gradually increased until now a shrinkage of 14 per cent, or even more is not unusual. And meanwhile there has been no important improvement in means of transportation between the Islands districts and Pará. Evidently there is a smaller percentage of solid rubber in the milk than when the trees were fresher, and with the same amount of smoking as formerly more moisture is retained in the rubber to be lost during shipment. In other words, while the trees apparently yield as much milk as formerly, the real production of rubber per tree is less.

Mr Witt spoke of the rapid exhaustion of Caucho in all the districts where the Peruvians went in search of it, and it was his impression that the trade of Iquitos, largely based upon Caucho, was not, for this reason, showing any increase. There was a possibility, however, that with the total exhaustion of Caucho on the upper Amazon—say within the next ten years—the Peruvians might turn their attention to gathering fine rubber, and thus replace in a measure the Caucho trade.—*The India Rubber World,* July 1.

TRINIDAD PRODUCE REPORT.

Trinidad, July 2nd, 1902.

Produce.—Cocoa.—Owing to a less active demand for European account, and also in consequence of slightly better receipts from the country during the earlier part of the fortnight under review, our local market has become somewhat easier and we quote to-day from $13·25 to $13·75 per fanega as in quality. The alternate dry and wet weather which we have been experiencing has had a beneficial effect on the cultivation and the outlook for the next crop appears to be rather hopeful at present. There have been further moderate arrivals from the Venezuelan coast and we quote for Good Ordinary grades from $13·50 to $13·60 per fanega.

Copra.—Receipts from the country are small and the price is firm from $2·85 to $3 per 100 lbs. Quality made is very ordinary on account of the difficulty of drying with the present rains.

"CAPITAL" ON THE INDIAN TEA CESS.

The writer of Current Coin in *Capital*, in the issue of August 7th, thus comments on the Indian Tea Cess :—"I do not anticipate that there will be any violent representations against the imposition of the Cess, though the unexpected not infrequently occurs. I am not at all sure that the proposed Cess will do more than lessen the returns to the shareholders ; but as drowning men clutch at straws, so shareholders, who have not received any return on their capital for years, must be ready to clutch at any expedient, for it cannot put them in a worse position. I consider, however, that a Cess of one-fourth of a pie per pound on all Indian teas exported by sea from India is not at all a happy idea. The biddings at the auctions here advance by pies per lb. The tax is to be not more than one-fourth of a pie per lb. The question is—On whom is this tax to fall, on the consumer or the producer? The accepted doctrine is that all taxes fall upon the consumers, but this is not so when the supply is in excess of the demand. If the tax is to fall on the purchaser of teas at auction in Calcutta, he will surely protect himself by bidding one pie less, and consequently to obtain one-fourth of a pie for advertising purposes tea growers will give away three-fourths of a pie. Can anyone imagine a more wasteful scheme? Of course in the case of teas shipped direct by the gardens to London this argument does not obtain. But the effect of the Cess will be to encourage the direct shipment of teas to London by a bounty of three-fourths of a pie per pound. Is this intended? The right mode of levying the Cess would be by an octroi on all tea coming into Calcutta or Chittagong, and this could be as easily levied as an export duty. All tea comes by rail or river steamers, and the matter could be easily adjusted. The present idea is clumsy. I am not in favor of a compulsory cess but, if there is to be one, let it be levied on business principles. There is one thing that shareholders in Tea gardens should bear in mind, and that is that t is not in the interests of the managing agents to curtail the output of tea. There are so many little profits to be made out of the handling of the

chests that a reduction in output does not answer the agents' purpose at all. Hence gardens are often worked that are an absolute drag on the tea company, the agents apparently always hoping against hope that they will come round in time. Meantime all the little items of profit go merrily on. If the tea is shipped to London there is a commission on acceptance of bills, the various little commissions of the London house, the private wharf profit and the like ; the shareholders do not see them but they are there. And this reminds me of a little story of a ship captain who used to trade to Calcutta in the good old days. In his accounts there duly appeared an item of "Buggy hire." The owner demurred. He objected to the Buggy hire and told the captain that he would not pass such a charge in future. On the next voyage the accounts were presented as usual, duly scrutinised and passed, the owner remarking that he was glad to see that the obnoxious charge no longer appeared. "Ah !" murmured the worthy skipper under his breath, 'you may not see it but it, is there all the same. '

ACETYLENE TO ENTICE INSECTS.

The current number of the *Acetylene Gas Journal* points out the advantages of this new illuminant for enticing night-flying destructive insects to their doom in orchards and other places. The Journal says :—" By means of acetylene, for instance, it is possible to establish bright lights everywhere in the orchard or about the grounds in a way that is wholly out of the question with the electric arc. The expense of acetylene for such purposes is likewise very moderate. The manner of employing acetylene, for insect destruction, is by placing a low standard, surmounted by a burner of the gas, in a pan which holds a mixture of vinegar and molasses or of kerosine, the light being fed from a generator near by through a hose. The smallest kind of generator or any kind of a portable acetylene lamp, such as a bicycle, a miner's or a table lamp, is suited to this use, by placing the same in, or just over, a basin of the liquids named. It is well to have a receptacle of some size, as the idea is to drown the insects. In the month of July, 1901, in Beaujolais, France, more than 177,000 moths were thus killed in the space of 18 days. Twenty little lamps were emplyed for the purpose, the consumption of each costing 8 centimes per evening."

FORCED PLANTATIONS.

(*From a Correspondent.*)

Attention should be called to the practice adopted by gardeners and fruit merchants, more especially in recent years, to ripen plantains artificially for the market with a view to obtain a quick sale. The result is that the fruit is rendered soft and pulpy and the flavour destroyed. Plantains forced in this way become rotten and worthless very quickly, and therefore have not the same value to those who purchase them. Forced plantains may be known by the softness of the fruit, and by the greenness of the short stems by which they are attached to the stalk of the bunch. If allowed to ripen naturally, the stems ripen with the fruit into a pale straw colour and the fruit is ready to be eaten as soon as it can be removed from the stems without the slightest effort. This is not so with artificially ripened fruit, as the short stem remains green and tough, so that it is difficult to remove it, while the rind appears to be ripe.

It may be interesting to relate what this artificial process is—a process which seems to be spreading extensively throughout South India. A large earthen pot is taken and a bunch of plantains with some leaves is put into it. Another pot of similiar make but smaller in size is filled with straw, and its mouth placed on the mouth of the larger pot. The mouths are then sealed with cow-dung (that useful article to many people in this country) and occasionally with clay instead. A hole of about an inch in diameter is made in the bottom of the smaller pot, which is upside down, and a piece of glowing ember, or charcoal, is put through the hole and placed on the top of the straw. A current of air is then blown by the mouth through the hole for a few minutes. This fans the glowing ember inside, and smoke from the ignition of the straw is forced down into the vessel containing the fruit requiring ripening. After this the whole is sealed to prevent air from entering. This is done in the morning, and repeated in the evening, and also on the morning of the next day. If the plantains be wanted very soon, they are smoked a fourth time.

It is a pity that this forcing process was ever resorted to, as it will be abundantly evident that not much flavour can remain after it is over. Europeans should set their faces against it, and refuse to buy such artificially ripened fruit. If ladies would give strict orders to their cooks not to buy such plantains, but only those that have been allowed to ripen naturally, and if Hindus would do likewise, fruit merchants would soon stop such a practice. The plantain is a most wholesome and nutritious fruit, especially the *rastali* and the *poovazhai*, which are among the best table plantains. When properly ripe and in good condition, and mashed ap with a fork on a plate with a liberal supply of milk, plantains make an excellent dish and are easily digested. But in these days, when fruit merchants hasten to bring about a quick sale by the forcing process, one almost despairs of ever getting a good plantain possessing its natural and delicate flavour, so much prized by many people in this country,—*Madras Mail*, Aug. 10.

INFUSED TEA LEAVES AS MANURE.

(To the Editor, *Indian Gardening and Planting.*)

Sir,—*Re* your note on infused tea leaves as manure, I remember many years ago a friend of nine in Madras treating a small tea-rose plant with the remains of his tea pot. I have never yet seen a rose plant blossom as that did. It was for about two or three months one perpetual bloom, fresh flowers coming up as fast as others were cut off. My friend was going to France and he gave me the plant, which by that time had ceased flowering. It never flowered again. The tea infusion with the infused leaves must have been too forcing, and a few months after it withered and died. I was very sorry, because the flowers, though small, were every one of them perfect, and somehow I never could get another plant like it again, though I looked up a number of neighbours' gardens. This experience of mine might be of use to those who would try infused tea leaves as manure. W.

—*Indian Gardening and Planting*, Aug. 7.

RUBBER ACCORDING TO THE CONSULS.

CEARA.—Mr. Acting Consul Williams reports that the rubber exports of Ceara were small, owing to the high duty collected by the State on the rubber exported; part of what used to come to Ceara from the neighbouring States of Piauhy and Rio Grande de Norte was exported from the States that produced it.

CONGO.—To the consular report of Mr Whitehead are added the following remarks:—Exportation of rubber has nearly trebled since 1898, and that commodity is by far the Congo's most important article of commerce. During the year under review the export of rubber amounted to £1,758,638 in special, and £1,807,327 in general commerce, out of totals of £2,019,536 and £2,160,302 respectively. The 'special' commerce thus differentiated from 'general' means the exportation from the Congo of products yielded within the territory of the State. Of the total 'special' export of rubber, amounting in value to £1,758,638, Belgium's proportion was £1,713,926, and the United Kingdom's only £188! Of the 'general' commerce in rubber, amounting in value to £1,807,327, Belgium's share was £1,747,323, and the United Kingdom's but £1,162. Little wonder that the importance of Antwerp as a mart for rubber has grown at a great rate since the Belgians set themselves to exploit the 'Independent' Congo State. From the report itself it would appear that the satisfactory development of the commerce of the Independent State of the Congo continues; that it is largely, though not entirely, owing to increased exports of indiarubber, and that this trade is almost entirely in Belgian hands.

COLOMBIA.—The Colombian Consul-General in London has made the following communication to Reuter's Agency:—"A contract has been secured from the Government for the navigation of the Caqueta and Putumayo rivers with their tributaries. The concessionaire (Mr. J Bidlake) is permitted the free introduction of boats and such machinery as he may require. He is to receive 1,250 acres of land for each vessel he puts upon the rivers. He has also the right to build wharves and necessary buildings on public domains. The contract is to continue in force for ten years. The territory covered embraces the larger portion of Southern Colombia, and includes a vast rubber forest, the extraction of the product being the main object of the enterprise."

PERU-BOLIVIA.—H.M. Consul-General at Callao remarks that the india-rubber industry is likely to progress, as, from all accounts, the forests of Peru contain innumerable rubber trees. From 1st July, 1900, to 30th July, 1901, grants amounting in the aggregate to 1,240,000 acres of forest land, said to contain valuable rubber trees, have been made by the Government. These lands lie in the Departments of Huanaco and Cuzco. The periods of the grants are either five or ten years. The royalty claimed by the Government is 2s for every quintal of rubber which is exported. During the same period six other concessions were granted under somewhat different conditions. One of the grants comprised 4,942 acres and the others 1,235 acres each. These grants are divided into plots called 'estradas.' Each 'estrada' contains within its boundaries 150 rubber trees. The royalties levied in this case are 20 cents annually for each 'estrada' and 20 cents for each hectare of land which the estradas cover.—*India-rubber Trades' Journal*, July 7.

CAMPHOR MONOPOLY IN FUKIEN.

On the authority of the Japanese Foreign Office, it is now stated (says the *Kobe Chronicle*) that the Chinese Government has decided to establish a Camphor Monopoly Office in Fukien, placing the manufacture and sale of camphor under the control of the Japanese. It is not correct, however, to say that the monopoly right of the camphor trade is to be conceded to the Japanese Government. In future the Japanese may be a party to the camphor business by contributing a part of the expenses of monopoly, but no definite arrangements have yet been made.

POULTRY BREEDING IN RUSSIA.

Without any great exaggeration it can be said that there is no house, no family in Russia, where poultry is not bred. Peasants in their small izbas, big landlords on their estates, and even inhabitants of town breed poultry, mostly hens for laying and for supplying the market. Beside hens, other kinds of poultry are also kept, as geese, ducks, turkeys, guinea-fowls, peacocks, swans, and even certain species of non-domesticated birds—as partridges, turtle-doves, black-game, woodcock, etc. All possible species of hens can be found in Russian poultry yards, and amongst them those native to England and America—as Cochin China, Brhamapootra, Langshan, Plymouth Rock, Wyandote, Dorking, etc. But the thorough-bred hens are to be found mostly in poultry yards owned by amateurs. The average country inhabitant, however, does not possess any superior kind of poultry; he owns generally mongrels, and attaches more importance to the quantity of the birds than to their good qualities. But there exists in Russia two breeds of hens which are looked upon as national breeds. They are, firstly, the Orloff, and, secondly, the Paul species. Opinions are divided concerning their origin; some attribute it to Count Orloff-Tchermensky, and others to an Oriental stock from Persia. The Paul breed got its name from the village of Pavloff, where it was first obtained in Catherine II's reign. These two kinds of hens, bred in Russia for more than a century, are entirely unknown to the outer world, and they are so exclusively Russian as are the fighting cocks in England. The Orloff and Paul breeds are rather sportive than utilitary breeds, although they are not wholly lacking in the latter qualities. Goose breeding is widespread. It is probable that formerly it attracted amateurs, as there are still existing some special breeds peculiar to Russia alone, for instance the fighting geese of Toula, Arzamass, and Kolmogory. They have a round head, large forehead, and a very short but strong beak. Their flesh is savoury, they are very prolific, and easy to breed. The duck is equally widespread, but we seldom meet superior breeds, as Rouen, Aylesbury, Pekin, etc. The same can be said about turkeys; the better species, as the Cambridge or the American one, are principally to be found in amateur aviaries. The peacock is exclusively bred merely as an ornamental bird, and has no economical importance. The same may be said about the swan. Partridges, quails, woodcocks, and blackbirds are bred on big country properties for sporting purposes, and not for the market. Pheasants are bred more abundantly, and there are some well-known estates as, for instance, Luamenskoe, belonging to Their Imperial Highnesses the Grand Dukes Nicholas and Peter Nicolaevitch, and

Bialo-Tserkew, belonging to Count Bianicki, which can vie with the most perfectly kept covers of other countries. As Russian people do not eat pigeons as a rule, they are only bred by amateurs. There are, however, some national breeds, as Turman and Tchisty, and there exists also a charming little species with a top knot, known as the Bukhara pigeon. In the last twenty years many bird-breeding societies, with wide ramifications, have been formed, constituted principally by amateurs, who organise Shows and contribute to elevate the level of poultry breeding. But we can say that until then there was no scientific poultry breeding in Russia. It occupied no place in rural economy, and as its production was not expensive, people were satisfied if they had enough poultry and eggs for their daily use. Things are different now, and the trade in this line has reached vast dimensions. Unhappily, we do not possess exact statistic data about Russia's production and its home consumption. We have, however, some indication about poultry export. In 1897 the export was valued at 35,000,000 roubles, and in 1898 at 40,000,000 roubles. Compared with other countries, Russian export occupies the first place. The principal item in the export is eggs. Of the 40,000,000 roubles in 1898, 32,000,000 roubles were for eggs, and the remaining 8,000,000 roubles for poultry proper. Its production is increasing by leaps and bounds, and will presently assume gigantic proportions. As the Russian climate, with the exception of the extreme north, is very favourable to poultry breeding, we may suppose, as foreign demand is constantly increasing, that the production will rise and that commercial companies will be started to organise the export in the best possible way,—*Russia*, July 19.

WOOD FUEL.

Mr D E Hutchins, whose valuable paper on 'Forestry, read on November, 22nd, 1899, will be in the remembrance of those members who are interested in the subject raised in *Nature*, of the 10th July, a rather novel question in connection with the supply of timber. He suggests that it would be worth while to cultivate the wattle or eucalyptus vegetation in Australia or South Africa, with a view to its being used as fuel. He argues that eucalyptus planted on tropical mountains would produce wood fuel at the rate of 20 tons per acre per year in perpetuity, and points out that, by a calculation of Helmholtz, a eucalyptus plantation would store up about one per cent. of the solar energy received on the unit of area. Its dry timber, which weighs 60 pounds per cubic foot, as compared with coal weighing from 50 to 52 pounds, is said to have an equal or higher thermal power than coal. As these calculations were made from natural forests, Mr Hutchins argues that by selection and cultivation, even double the amount might be produced where there was a powerful sun, a heavy rainfall, and a very rapid forced growth. Very large districts of the world would supply the requisite conditions, and he looks forward to a yearly output of over 40,000 million tons, or even on an average forest yield of 20,000 million tons, the world's yearly output of coal being calculated as 663 million tons. The suggestion is certainly a novel one, but its merits and its practicability must be left to be discussed by experts on the subject.—*Journal of the Society of Arts* July 25.

MINING EXPLOITATION in the Dun is likely to receive a stimulus from the fact that Messrs Bird and Company of Calcutta have obtained from the Government of the United Provinces a license to prospect for minerals over an extensive area in that locality.—*Indian Agriculturist*, Aug. 1.

JOTTINGS FROM SUMATRA'S EAST COAST :

(Coffee-planting by an ex-Ceylon Colonist.)

"Hard times, alas! are with us still
The coffee-planter's lot—
Allowing him only just enough
To boil the daily pot."

—*Ancient MS.*

'Tis a bad sign in coffee here that some folks are beginning to reckon on 'next year,' that will-o'-the-wisp which deluded with false hopes so many Ceylon men in the sad years between the decline of coffee and the rise of tea.

We have just had one of the most wonderful blossoms I have ever seen, so we are all right for 'next year.' But from all I hear there are some quaking hearts wondering if they can hang on till then. Last year, in addition to the plague of caterpillars, we had an abnormal and prolonged drought which was fatal to blossoming, and the consequent short crop which we are now taking in presses hardly on all. Twelve months ago we were working day and night with hand-pulpers to work off our coffee and sending our parchment to Singapore to be cured, Now we are all provided with grand establishments: put in the pig at one end, press the button and cured hams and sausages come out at the other. But pig *won't* get over the stile, and I fear me some of us *shan't* get home tonight.

I've just had

A RUN THROUGH THE DISTRICT,

Serdang I mean, and I never saw coffee looking in better heart. Rich, dark-green foliage and plenty of good wood, but everywhere the same; no crop, or only a very little. The caterpillar-stricken patches are different. They bear the mark of the beast most unmistakably, and it will be long before they recover their vigour.

Most men seem to think that the damage done by the caterpillars is confined to the denudation of the tree of its leaves. I am inclined to think that a further mischief is done by the caterpillar in imparting a poison to the sap of the trees. Of course, I can prove nothing; but I am very strongly of this opinion. Anybody coming over here now with a view to *speculative* investment, in the event of Brazil cutting its own throat, could certainly pick up a bargain or two. The statistical position is appalling: and if Brazil goes on for another two or three years at its present rate of increasing production, and can stand the racket, the East Indian

COFFEE PLANTER

will be as extinct as the dodo. If on the other hand Brazil, as is stated, has overdone it and must reduce its output by more than one-third, there is a good time coming for us. We shall be able to pay our debts and drink champagne on birthdays!

However, in view of considerably over a quarter of a century's experience in the East, I make it a rule to keep a stiff upper lip and be prepared for the worst; and when it comes, take it smiling: and if you can't take it smiling, take it as smiling as you can.

————Shut up you Pessimist.

Pessimist.—Go to the—inkpot you interfering—It is always pleasant for

AN OLD CEYLON MAN

to hear his old country well spoken of. Some days ago I met a friend who was one of a special-train-party sent up a few months ago to Kandy—chiefly I think through the enterprise of the well-known Manager of the Queen's Hotel. My friend was full of praise of the country and all that therein is. The railway, the view from the railway, the mountains in the distance, the smiling terraced paddy-fields below—these, we thought, had exhausted his vocabulary. But no! Peradeniya was yet to come. My friend is a great amateur of all sorts of tropical botany, and it was surprising what an amount of detail he had been able to observe in what must of necessity have been more or less of a hurried scamper. His observations were sharp and to the point; his praise unstinted; his admiration unbounded. More was to come. But in few words:—'Kandy,' he began—there was a pause—'Kandy,' he began again and lay back in his chair: 'Kandy is the most beautiful place in the world!' And he lay back in his chair, puffing huge rings of smoke, through which I suppose he revisited 'the most beautiful place in the world,' for nothing more was to be got from him that night.

The same gentleman on his return the other day had only four hours to spend in Colombo, and these he spent in looking for seed-nuts of the king coconut, but without avail. He wants them sorely—not for trade purposes; but merely to add to his orchard which is a most comprehensive one; and if any lowcountry reader of these lines has a sympathetic heart and would like to profit

BY EXCHANGE OF FRUITS,

let him put a few seed-nuts of the king coconut variety into a gunny bag and send them to O. Puttfarcken, Lobo Pakam, O.K. Sumatra, and he will certainly get a good return in other Tropical fruits not common to Ceylon. Please, Mr Editor this is not an advertisement, but only an opportunity for gentlemen gardening *for pastime only* to exchange the 'fruits' of their experience.

But anybody sending such things to Sumatra's East Coast (O.K., Oost Kust, East Coast) should always ship by *North German Lloyds*. By other lines your parcel may go to Bali, Lombok, Macassar, even Samoa, or somewhere. *'It 'im over the 'ead with a 'ard 'eavy 'ammer and make im 'owl 'orrible.* It was not the Socratic one this time, but another little beast in his image—just as I thought I had him by the neck, he disappeared into the ink-pot again.

26th July, 1902. W. T. McK.

PRODUCE AND PLANTING.

"CEYLON AND ITS PLANTING INDUSTRY,"

Mr J Ferguson writes: "The most notable fact revealed by the figures is the falling-off in the area of tea, the total in cultivation on plantations being 4,000 acres less than a year ago, or, including native gardens, a decrease of 6,000 acres, making a total of 386,000 in place of 392,000 acres. This must be due to the abandonment of non-paying fields and of some unprofitable gardens; for it is accompanied by an extension of the total extent in cultivation by 1,000 acres, although poor 'coffee' has gone down, being 3,200 acres less than a year ago. Cacao, on the other hand, is 500 acres more in planted extent; cardamoms are greater in area by 1,800 acres; cinchona shows an increase of 1,000 acres; and India-rubber (chiefly the Para or Hevea variety) of nearly 1,000 acres—which must, however, be rather under the actual area planted during the year, our total extent planted being about 3,400 acres. In several minor products, too—camphor, nutmegs, crotons—there has been a good deal of planting, and still more have we had in the Kelani Valley and other low country estates, a planting out of coconut palms among the tea, just as Para rubber has been put in freely on the Kalutara tea estates. The check to tea, and the act that there are no clearings this year to plant ought to strengthen the hopes of those who believe in a future for our staple, so soon as consumption overtakes pro-

for our staple, so soon as consumption overtakes pro-

duction. A year ago we anticipated that there would be 400,000 acres under tea at an early date in Ceylon; whereas now we are in reality back to 386,000, with no immediate prospect of extension. In our shipments of tea from Ceylon this year we are so far 5,000,C00 lb. behind the same date last year for the Uni ed Kingdom, but shipments to Russia and America show an increase. Our coconut palm industry—chiefly in native hands—covering 600,000 acres with a crop of one thousand million coconuts (for oil copra, fibre, desiccating kernels, &c.)—is in a highly prosperous condition; while that in cinnamon bark and in plumbago mining continues fairly satisfactory. The Boer prisoners are making preparations against their return home—the first transport calling at Colombo shortly—and are likely to take a good deal of Ceylon tea with them."—*H and C Mail* August 1.

PLANTING NOTES.

BERMUDA ARROWROOT.—A report on Bermuda recently issued by the Colonial Office states that the cultivation and manufacture of arrowroot, which were at one time important industries in that colony, have, from various causes, greatly declined in recent years. The arrowroot produced in the colony by the latest improved methods is of an excellent quality, and there is a good opening for investment of limited capital in this industry.—*Chemist and Druggist*, July 26.

EUCALYPTS are freely referred to in Ednie-Brown's volume on the "Forests of Western Australia"; but he often gives no scientific name. We quote two sentences:—

TUART.—This is a handsome Eucalypt, and has a wonderfully bright and cheerful appearance in the forest. The bark is of a greyish-white colour, and is smoothly crinkled and persistent throughout. The trees are always clean and bright-looking. In the young stage the species forms a very ornamental tree, and is planted as such in some of the other Colonies. It is straight, well-clothed, and has a beautiful bright-green leaf, and in this respect is not unlike the Karri.

CRIMSON-FLOWERING GUM.—This is referred to here, not because of its value as a timber tree but simply as a gorgeous and remarkable specimen of the forest flowering trees of Western Australia. The subject is a very handsome, branchy, umbrageous, small tree; its foliage is dark-shining green with the leaves standing out more flat, and not edgeways, as is usual with the eucalyptus family generally. The specimens which I saw ranged from 20 to 40 feet in height, with stems averaging about a foot in diameter. The bark is rough and somewhat like the red gum; the wood is a dark, blood-like colour. These trees had their branches sweeping down to the ground amongst the ferns.

TO THE PLANTING WORLD.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop August-September delivery 1902, booking necessary before the end of April, quantities of 100,000 and over at special low rates. Plants available all the year round, 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November, 1900:—"I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year." Special offer, post free on application.

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for August-September delivery 1902, immediate booking necessary; large quantities on special terms; Plants in Wardian cases.

A foreign firm of Planters writes under date 11th October, 1901:—"We beg to enquire whether you would procure us 100,000 Castilloa seeds, in which month we might expect them, and what would be the average price." Special offer, post free on application.

Manihot Glaziovii.—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter in sending an order for this seed wrote on the 22nd August, 1900:—"If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castilloa does not thrive."

Ficus Elastica.—Seeds available in May-June; booking necessary before the end of March; also plants.

Mimusops Globosa (Balata) wood of the tree is much sought for buildings, fruits sweet like a plum and eaten, oil from seeds, said to yield as much as 45 lbs. of dry rubber per tree per annum, the milk is drunk and when diluted with water used as cow's milk, grow from sea-level up to 2,000 feet, orders being booked for seeds and plants, price on application.

Cinnamomum Zeylanicum (Cinnamon superior variety).—New crop of seed in April to June; booking necessary before the end of February, also plants.

Coffee Arabica, Liberian Hybrid and **Maragogopie Hybrid.**—New crop March-April; immediate booking necessary.

A foreign Agricultural Department writes dating 9th September, 1901:—"Please accept our order for 175 lbs. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this department, and we will leave the selection of the varieties to be sent to your judgment."

OUR DESCRIPTIVE PRICE LISTS.

The following six Descriptive Price Lists are now being forwarded with Circulars and special offer of Seeds and Plants of Rubber and other Economic Products:—

1. Tropical Seeds and Plants of Commercial Products, enlarged edition for 1902.
2. Seeds and Plants of Shade, Timber, Wind-Belts, Fuel and Ornamental Trees, Trees for Road-sides, Parks, Open Spaces, Pasture Lands, Avenues, Hedges, and for planting among crops (Tea, Coffee, Cacao, Cardamoms, &c.)
3. Seeds and Plants of Tropical Fruit Trees including Mango grafts.
4. Bulbs, Tubers and Yams.
5. Orchids—Ceylon and Indian.
6. Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons, Roses, Dracinas, Shrubs and Creepers.

Special Arrangements made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in large quantities.

"South Africa."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Agents in London:—Messrs. P. W. WOOLLEY & Co., 90, Lower Thames Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Agent in British Central Africa:—T. H. LLOYD, Esq., Blantyre.

Telegraphic Address:
William, Henaratgoda, Ceylon.
Liber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
Tropical Seed Merchants,
Henaratgoda, Ceylon.

Correspondence.

To the Editor.

GREEN TEAS AND —— GREEN TEAS IN CEYLON.

Stagbrook, Peermaad, S. India.

SIR,—In your footnote to a letter signed "Willing to Learn," in yours of 18th July you refer to "Green Teas" as "*manufactured*" at Ambewatte Mills. I have again to point out to you and such of your readers as are as hazy on the subject of "Green Tea manufacture" as is "Willing to Learn," that "Green Teas are" *not manufactured* at Ambewatte Mills; but that manufactured Green Teas are coloured and restored there. There is no secret about the process. It is merely a matter of extra expense. "Willing to Learn" can see the process for himself as adopted in Japan on pages 12 and 27 of the Report of the British Vice-Consul at Yokohama upon the Japanese Tea Industry, printed at the *Observer* Printing Works. Machines can be bought for colouring large quantities quickly instead of using the Panning Process described in above report for about £375 f.o.b.; but probably after reading the article on Colouring of Tea on page 27, he will bide a wee before following Messrs. Finlay, Muir & Co.'s example.—I am, sir, yours faithfully,

H. DRUMMOND DEANE.

P.S.—If experts in colouring green teas are wanted, there are many men in India who have nothing to learn from the Japanese.

[It is very good of Mr. Drummond Deane to enlighten us; but we have yet to learn that he has been inside the Ambewatte Mills to see all the process. Here is what Mr. A. K. Muir said in England the other day:—

A factory has been erected in Colombo and equipped with the necessary machinery for making green teas in the Chinese and Japanese fashion. This factory is capable of turning out about 3,000,000 lb. of green tea per annum. About one-fourth of this quantity is at present being manufactured there, and if it proves that 3,000,000 lb. can readily be sold in the United States and Canada the output will be increased accordingly.

—ED. *T.A.*]

THE "MANUFACTURE" OF GREEN TEAS IN COLOMBO; MR. DRUMMOND-DEANE EXPLAINS.

Stagbrook, Peermaad, S. India, Aug. 2.

SIR,—With reference to your footnote to my letter in your issue of 28th instant, it is not necessary for me or anyone else to go inside the Ambewatte Mills to know that any large quantity of green tea leaf could not be transported to Colombo and *manufactured* there. On the other hand manufactured leaf can of course be transported there and sorted or coloured in any way that is found paying, and I for one wish the enterprising firm in question every success, though I doubt the desirability in the long run of colouring Ceylon and Indian Teas. Mr. A. K. Muir, when he spoke (in the speech you quote) of "making" green teas in the Chinese and Japanese fashion, was not talking to manufacturers but to consumers, and, if he had used the words "turning out" instead of the word "making," he would have been absolutely correct; or had he used the word "into" instead of "to" he would again be correct. Not that such a slip would matter at all to the general public, but here in India and Ceylon it is a different matter because many men are thinking of "manufacturing green tea" but reluctant to begin so long as from your editorial chair the fiat goes forth that to "manufacture" green teas on the best Japanese lines, intending manufacturers must either obtain an entry into the "Ambawatte" factory or be out in the cold. This is a fallacy. If any gentlemen wish to colour their green teas I have no doubt Mr C Judge of 47, Free School Street, Calcutta, will, for a small remuneration, give them every particular for doing so by hand. If they wish to do it by machinery it is a mere question of a very expensive machine. Two very large gardens in India are colouring their teas with great success as regards appearance, to my personal knowledge, though their teas are made on the system first introduced into Ceylon and India by myself.—Yours faithfully,

H. D. DEANE.

[The above letter, we take it, was written before Mr. Drumond Deane saw Mr. Leslie Rogers' report on Ambawatte samples? Our latest news is of a leading Ceylon planter who was, in confidence, taken through Ambawatte and who expressed himself as perfectly satisfied as to no extraneous substance being added to the teas. At the same time our correspondent is right about planters having to continue on his plan of turning out green teas.—ED. *T.A.*]

"THE CONSOLIDATED TEA AND LANDS" AND "AMALGAMATED TEA ESTATES" COMPANIES.

In re "COMMISSIONS"—AN EXAMPLE TO BE FOLLOWED?

July 21.

DEAR SIR,—There is a *down* among some Ceylon tea planters on what are called the "Muir Companies"; but it seems to me, Sir, that much occurred at the Glasgow meetings of the "Consolidated" and "Amalgamated" Companies deserving of praise from outside planters. There are Planting Companies in Ceylon that pay no dividends; but the remission of fees and commissions is rare? Here is the Chairman's reference in Glasgow:—

"With a view to enabling the directors to make up the full sum drawn from the reserve account last year and thus place the company again in a dividend-paying position as soon as possible, the Calcutta and Colombo agents have agreed to give up to the company, for the benefit of the revenue account of 1901, the whole of their commissions for that year; the directors have returned one-half of their fees, and the London agents have also returned one-half of their commissions."

There are other passages in the proceedings that you ought to copy and emphasize.—Yours, etc.,

FAIR PLAY.

[We regret not having given the proceedings in full. Mr. A. K. Muir, who is a keen man of business—as we saw in Calcutta—made a capital Chairman; but he was inclined to be a little too sanguine—for instance, at the "Consolidated" meeting, he said:—

"There is no doubt, Gentlemen, that the tea industry has, for the last two years, been passing through very trying times, but the present position is not by any means so gloomy as might be imagined from the market quotation of tea shares. Without being unduly optimistic, I think there are some indications that the tea-growing industry will, before very long, again enjoy a period of prosperity. The remarks recently made by the Chancellor of the Exchequer may fairly be taken as equivalent to a promise of the early removal of the additional 2d per lb. on the duty on tea, which has been a serious burden on the industry, as it has undoubtedly been borne almost entirely by the producers. The consumption of Indian and Ceylon tea has been going on increasing satisfactorily, and if it continues at the same rate should before long overtake and pass the production. . . , The export of tea from China has been steadily declining. [Not so, for the present season.—ED. *C.O.*] In Japan there has been a marked advance in the price of labour, so much so that it has become impossible in many districts to grow tea at a profit. In these districts, I am informed, the tea bushes have in many cases been pulled up and mulberry trees have been planted in their place. The exports from Japan have fallen off over 10,000,000 lb. and it will be difficult for them to make their exports up to the old figures. For the past few years both the Chinese and the Japanese have tried to off-set the advance in labour and the lower prices in the United States by putting less labour on their tea. I refer now to the rolling. The result has been that the quality has fallen off very considerably."

Later on, he stated:—

"As regards finding other fresh outlets, I may remind you that the Australian markets are now free and that the American tax will be removed next year. Progress in America has, so far, been disappointing, and Indian and Ceylon producers are beginning to realise that if they are to make headway there they must set themselves to turn out the class of tea which the Americans want. There is a market for over 60,000,000 lb. of green tea in America, which sells at from 7d to 1s 6d per lb., the average price of green tea in America being about 8½d to 9d per lb. These teas are made in China and Japan, and it seems reasonable to suppose that if we are to produce an article suited to the American taste we must study the methods of China and Japan. With his object in view the Anglo-American Direct Tea Trading Company, Limited, have during the past year had a representative in Japan, studying the system of manufacture adopted there. A factory has been erected in Colombo and equipped with the necessary machinery for making green teas in the Chinese and Japanese fashion. This factory is capable of turning out about 3,000,000 lb. of green tea per annum. About one-fourth of this quantity is at present being manufactured there, and if it proves that 3,000,000 lb. can readily be sold in the United States and Canada the output will be increased accordingly."

Mr. Wm. Mackenzie made some remarks worth quoting:—

Mr W Mackenzie, after referring to some items in the accounts, and the necessity for economical work, said he hoped commissions on results would continue to be paid to estate managers. Personally, he thought the reserve fund, which now stands at £65,000, should be applied in wiping out such nominal assets as debenture expenses and preliminary expenses, and in reducing block account, to which he noticed interest continues to be charged. He also thought it would not be fair to use present valuations as a test per acre. We went in at a high value, and things have fallen a bit, and therefore we cannot be too mathematical, but must consider the circumstances, and what is good for practical protection.

At the meeting of the "Amalgamated," the Chairman said:—

As mentioned in the report, the Calcutta and Colombo agents have, in view of the disappointing results of last season's working, voluntarily agreed to give up to the company for the benefit of revenue account the whole of their commissions for the year. The London agents have also agreed to give up one-half of their commissions, and the accounts have been framed on that basis. As regards the future, you will no doubt also appreciate the offer made by the Calcutta and Colombo agents to accept lower remuneration than they are entitled to under their agreement while the depression in tea continues. The planted area of the company's properties is now 13,491 acres. The estimated yield of tea for the current season is 3,175,280 lb. As stated in the report the increase expected is mainly from the company's young estates in Assam, which are now coming into bearing, and which, having been planted with a high-class jat of tea, should help to improve the average price of the company's produce. . . . The company's coconut estates in Ceylon, aggregating about 1,000 acres, continue to make satisfactory progress, and the growth of the palms generally is reported, according to latest advices, to be excellent. While this is so, these properties cannot be expected to contribute to the profits of the company for two or three years owing to the long period this product takes to mature.

Mr. Alex. Mann, the Company's Visiting Agent, made an important statement, the closing sentence especially being noticeable:—

This company has the great advantage of having most of its properties in the two best tea districts in India, viz., in Assam and Darjeeling, and it is rather unfortunate that these are the two districts that have suffered more than others last year in quality of manufacture.

It may be pointed out that there is practically no more land suitable for tea to be had in the Darjeeling district, so the over-supply too often heard of in connection with tea generally should not apply to teas from this hill district.

—ED. *C.O.*]

CACAO—AND ITS FERMENTATION.

July 22.

DEAR SIR,—Your appeal to Cacao planters to give their experience in the way of fermenting and washing (in connection with Mr. Renton's valuable information) will, I am afraid, not be responded to. Is it shyness or egotism?—the latter I think. If it is the latter, it is a mistake; for I dare assert that the produce of the individual planter will not receive much attention in the market if the country is thought to produce an inferior article.

Much is to be learnt about fermentation, that mysterious operation. It wants a specialist, and it has to differ for every variety.

Coincidence—this is what I wrote on June 16th to my London agents;—"Our cacao is not appreciated in Germany on account of its sour smell, it is said, which is due to the washing. To obtain the red colour outside, appreciated by London buyers, it is necessary to wash after a day's fermentation, dry slowly, give another night's fermentation, dry slowly. This way of fer-

menting leaves the bean devoid of the chocolate taste, when a longer continuous fermentation, taking care not to overheat, brings it out but darkens the skin. To dry the bean without washing gives it a dirty appearance and renders it more liable to mildew. It is the reason, I think, for which in some parts of Central America they earth the cacao (Puerto Cabello, the highest priced, is earthed).—Yours truly,

CACAO PLANTER.

CEYLON TEA CHESTS AND TEAS FOR THE CANADIAN MARKET.

July 27.

Dear Sir,—In view of the recent official correspondence published by the Tea Traders' Association *re* Ceylon-made chests, the enclosed letter will interest all your planting readers, especially as it refers to Ceylon "greens." The writer, as you will see, is a Japanese tea importer in Montreal and should know what best suits the trade generally. It may also be as well to point out that pine chests were only imported by local merchants when Momis could not be obtained. We don't think many are coming forward now.—Yours faithfully,

MERCHANT.

Montreal, March 12.

In reply to your inquiry *re* the prospect of Ceylon and Indian teas with the Canadian market, I may tell you my own opinion, which is that they have a good prospect in blacks as much as Japan has in its greens. They try quite hard to compete with us in green tea recently, but unless they make still further improvements, I do not think they can ever displace us from the market. There are many defects on their part if I point out, but it is needless to say to you about its make, etc., except something wherewith you are interested directly. It may be interesting to you to know (as you are exporting Momi Tea chests) that I have seen many packages of Ceylon tea which are not of (our) Momi wood, but of pine; the latter, in my opinion, is not from Japan and resembles very much Chinese pine. As you have some idea of tea, you should know that boxes for tea, made out of pine wood either from Japan or elsewhere, cannot be good for tea; and I am greatly surprised to see the Ceylon merchants (who are so earnest in pushing their tea and effecting all kinds of improvements) use boxes made of pine. The boxes that I saw at your mills are very good and very suitable. Don't you supply large quantities? Perhaps China pine is cheaper, but cheap things always come out dearer in the end and I shall not be at all surprised if this is found out and pine boxes avoided altogether. I have also seen some boxes which, I fancy, cannot be made in China or Japan, as the wood appears to me to be from some very cold country in the North part of Europe as far as my knowledge of lumber tells me; you may perhaps know where they come from. Without anything further interest,—I remain, yours truly.

A GOOD TREE FOR TEA ESTATES.

August 5.

Dear Sir,—The tree referred to by a Dimbula Manager in your issue of the 30th July should be *Ailantus*: I think it appears in the Peradeniya Gardens Catalogue as *A. malabaricus*. It was planted in the south of France about thirty years ago as a food for one of the new species of silk-worms then introduced, and on a small scale in English gardens on account of its ornamental appearance.—Yours faithfully,

B.

["Ailantus Malabarica"—is no doubt the tree and here is Trimen's information:—

"Low country of the moist region ; rather rare. Seven Korales ; Colombo ; Heneratgoda. Fl. Jan. ; white. The bark is tonic and febrifuge. A brown, fragrant, resinous exudation is given by the inner bark, and is used in dysentery as well as material for incense. Wood very light, soft and spongy. Ailantus is from 'Ailanto,' said to be native name of *A glandulosa* in the Moluccas.'

From the "Treasury of Botany" we further quote :—

"Ailantus. The *Vernis du Japon* of the French, *A. glandulosa* of botanists, is in its native countries, China and India, where it is called Ailanto, a tree of large size and hendsome appearance, bearing numerous pinnate leaves from one to two feet long or more, and clusters of greenish flowers of a disagreeable odour. It is of rapid growth, making, when favourably situated, anuual shoots from three to six feet in length. Its German name, Gotterbaum, 'tree of the gods,' is said to be a translation of *Ailanto*. French arboriculturists recommended that its lateral branches should be annually lopped off, when the main trunk will ascend perpendicularly and sustain a symmetrical spreading canopy. In France and Italy, it is much valued as a tree for shading public walks, and is planted for that purpose along with the tulip-tree, horse-chestnut, plane, &c. Its leaves are not liable to be attacked by insects, which is a great recommendation ; nevertheless they are the favourite food of the silk moth, *Bombyx Cynthia* ; and they continue on the tree and retain their green colour till the first frosts of November, when the leaflets suddenly drop off, the leaf-stalks remaining on often a week or two longer. The wood is yellowish-white, satiny, and well suited for the purposes of the cabinet-maker. There are specimens, both in England and of the Continent, exceeding sixty feet in height. The name 'Japan varnish' seems to have been applied to it through some mistake. The genus belongs to the *Simarabaceæ*."

[Probably the Dimbula trees are from imported seed of *Ailantus glandulosa.*—Ed. *T.A.*]

TREES FOR TEA ESTATES.

Glasgow, Agrapatana, Aug. 9.

Dear Sir,—The trees growing on this estate, of which mention has recently been made in your columns, answer the description of Ailantus Glandulosa given in your issue of the 8th inst.

A small quantity of the seed was got by Mr. A L Cross, but I have no record of it, and he was unable to give me any information when I applied to him a few years ago. They are deciduous trees, shedding their leaves about the month of September, So far none of them have flowered. The growth compares very favourably with grevilleas of the same age. Some trees on this estate ten and eleven years old are about 50 feet high. They are handsome, healthy

looking trees, and I do not know anything better for growing amongst tea. I am taking steps towards having any doubt as to their identity removed.—I am, yours faithfully,

ROBT. WATT KERR.

JAK FRUIT IN INDIA AND CEYLON.

Aug. 7th.

DEAR SIR,—I learn on good authority that in India the largest and best jak fruits are borne on the roots of old trees, *i.e*, on such roots as come above the soil, which they often do in the case of very old trees. I have seen regular patriarchs of jak trees in Ceylon, with huge fruits hanging from all parts of the trunk down almost to the surface of the ground; but I cannot say that I have ever seen fruits produced on the roots. I should like to know whether the experience of any of your lowcountry readers agrees with my own or with that recorded in India. —Yours faithfully,

INTERESTED.

THE BRITISH NORTH BORNEO COMPANY.

Kandy, 11th August.

DEAR SIR,—I have just received the Report issued by the British North Borneo Company's Court of Directors for 1902, in which the following items, which may interest your readers, appear:—

Receipts in 1901 were	..	$655,569·02
Revenue 1900 do	..	$587,226·81
Increase of Revenue	..	$68,342·21
Disbursements 1901	...	$431,219·82
1900	..	$402,858·63
Increased Expenditure	...	$28,361·19
Imports value 1901	...	$3,262,763·70
Do. 1900	..	$3,178,929·20
Increase	..	$83,834·50
Exports value 1901	..	$3,382,387·64
Do. 1900	..	$3,326,621·39
Increase	..	$55,766·25

The Court of Directors propose declaring a dividend to Shareholders of 2 per cent on Shareholders' capital of £741,130, beside paying 5 per cent on debentures, £200,000.—Yours faithfully,

W. D. GIBBON, Agent.

JAK FRUIT BORNE ON ROOTS: A REPLY.

Galkissa, August 13.

SIR,—In reply to your correspondent "Interested", anent jak fruit in India and Ceylon, I have not seen a single jak tree in Ceylon the fruits of which are borne on the roots, but there are, as your correspondent is aware, trees with huge fruits hanging from the trunk and touching the surface of the ground. The former kind too is found wild in Panrute, a place on the South Indian Railway line near Pondicherry, noted for fruits produced on the root, which are considered very delicious,

M. P. C.

TEA OVER-PRODUCTION: A NEW SCHEME?: IS IT WITHIN "PRACTICAL POLITICS"?

Gammaduwa Group, Gammaduwa, Aug. 15.

DEAR SIR,—I trust the following will commend itself to the careful consideration and support of your readers. For a sum of £20,000 (twenty thousand pounds sterling) the output of Ceylon tea can be reduced by 7,500,000 lb. (seven million five hundred thousand pounds) being the yield of 30,000 acres of tea at the very moderate estimate of 250 lb. per acre. This can be accomplished provided the money can be found, and, handed to the Committee of the Planters' Association of Ceylon, who would, I presume, appoint trustees for the disbursement of the Fund. My proposal is that all Proprietors of tea estates, resident, non-resident or Companies, who find it impossible to cultivate tea at a paying figure, be invited to enter into a contract for one year with the Trustees of the Fund.

They must agree to bind themselves to cease plucking, from an area of their own choosing, of not less than 25 acres of tea, now in bearing, for a period of one year from 1st January, 1903, on condition they receive from the Fund the sum of 80 cents per acre per mensem, to enable them to weed the tea which they shall have ceased to pluck, and bound themselves not to pluck for that period.

Example: A Proprietor or Company having say 300 acres of tea in bearing (the youngest tea over four years old,) on agreeing to cease plucking 100 acres from the 1st January, 1903, would receive from the fund R960 during 1903. This sum would enable the Manager, to keep the 100 acres free from weeds during that time. Without attempting to go into details, I think a few of the advantages of the scheme are:—estates do not in any way suffer, rather the opposite; mortgagees would not interfere, they should rather approve, as the tea on the 100 acres would have improved by the rest. Buildings would cost no more to keep up; and a smaller labour force will be sufficient for the crop and maintenance of the other fields. Neighbourng estates, proprietors and managers would have no cause to complain of the condition of the abandoned tea, as it will, or ought to be easier weeded than the fields which are regularly plucked.

The objection may be raised that it will be impossible to check the Superintendent or the coolies should they pluck the tea on the fields set apart for the year, and that the tea would be sure to be plucked by some, though not in every case. I do not believe this could be carried on to any extent if at all without being discovered, as non-plucked tea fields are not so difficult to verify, but to help to guard against this the fund has still R12,000 from which Inspectors might be employed to make surprise visits to contracting estates.

I commend the above to my brother Planters in the full assurance that they will give it their careful consideration. The only difficulty, which presents itself, is, How are we to raise the money? The "Thirty Committee" requires all the Cess and more, were it available, and this lessening of production can scarcely come under the Ordinance which empowers that Committee to carry on its work.—Yours faithfully.

JAMES WESTLAND.

JAK FRUITS.

Trincomalee, Aug. 14th.

Dear Sir,—"Interested," in your issue of the 12th instant, makes enquiries of jak fruits borne on the roots of trees. I hear on reliable authority that in 1889 at Sampeltion, a village in the North, a tree in the garden of one Mutar Kadramer, produced a ripe fruit on the root, 6 feet off the tree, under soil not deep, and it was traced by the smell and a crack on the surface earth. Those who ate it tell me that the pulp was delicious. Yours faithfully, J. B. C.

NIYANGALA AND VEGETABLE POISONS.

Dear Sir,—With reference to the account of "deadly poisoning" as the result of eating a tuber of *Gloriosa Superba*, I think you will find that the use of the tuber "as an abortive for criminal purposes" (as Dr. Watt puts it) is by no means uncommon among the Tamils of the North.

The properties of such vegetable poisons and the means of detecting them, have yet to be studied by medical and scientific men who at present are, I believe, quite ignorant on these points: and there is little doubt that many a death from "unknown causes" or "dysentery" must be attributed to the effects of vegetable poisons—the study of which should furnish congenial work for our local scientific celebrities.—Yours truly,

ÆSCULAPIUS.

[What do the local Medical Association and Dr. Chalmers say to this?—Ed. *T.A.*]

TROUT.

August 19.

Dear Sir,—Referring to a cutting from an Aberdeen paper in your issue of the 18th *re* "Marked trout caught in Deveron," I hope the Provost and the Inspector of Fisheries will excuse me when I say, "Steady old boys," as I can only swallow that trout *cum grano*. A trout is a trout (yclept *salmo fario*, if an ordinary brown one) and if he ever attains the size of 6 lb. in the old country, my experience is that he's a very old trout, indeed, but no doubt there are exceptions to the general rule. Was that trout really a brown trout, a sea trout, a grilse or a young whale? The statement would not be at all a surprising one for Ceylon, where the climate and abundant food seem far more conducive to rapid growth than home conditions.

I have a well-authenticated case of a trout having increased from 1 lb. to 3½ lb. here in 6 months, but perhaps better not tell this to the Lord Provost or Mr. Inspector, as it might lead to a terrible waste of salt and strong language.—Yours faithfully,

PISCATOR.

The "Agricultural Ledger"—1902—No. I.—Indian Tanning Materials. A list of the raw stuffs of India which contain tannin, with notes on their composition and the preparation of extracts, by Mr D Hooper, F C S.

THE KANAN DEVAN HILLS PRODUCE COMPANY, LIMITED.

The report of the directors for the year ending 30th November, 1901, to be submitted to the fifth annual meeting to be held at 22, West Nile Street, Glasgow, on Friday, the 18th July, 1902, at noon.

The Directors beg to submit their report for the year ending 30th November, 1901.

The tea crop obtained from the Company's Estates amounted to 2,031,235 lb. compared with 1,444,695 lb. in 1900. While larger crops were gathered at both the Northern and Southern Indian properties than in the previous year, the yield from the latter, owing to unfavourable weather, was considerably short of the estimate. Latest reports as to the condition of the young plants are satisfactory, and point to the Estates as they come into full bearing giving a large average yield per acre. The price realised was 7.23d per lb. which is disappointing, but a distinct improvement in quality is expected by the local management as the Estates generally mature. The yield of Coffee was 1,495 cwts, and the Cinchona Crop amounted to 251,537 lb.

For some considerable time past, in view of the adverse circumstances affecting the tea-growing industry, the Directors have had under consideration the terms of the Agreement between the Company and its managing agents. While it was recognised that at the time the agreement was entered into its terms were reasonable, the agents, on being approached, expressed themselves as perfectly willing to consider a re-arrangement, and they voluntarily offered in future, during the continuance of the present depression in tea, and, while reserving their rights under the agreement, to restrict their charges as agents of this Company to their actual outlay, plus a Commission of 3 per cent on the nett profits. The managing agents have also, in view of the disappointing results of last season's working, voluntarily agreed to give up to the Company, for the benefit of the revenue account of 1901, the whole of their Commission for that year; and the London Agents have also agreed to return one-half of their Commission.

Given effect to the concessions referred to in the preceding paragraph, the accounts show a balance at credit of profit and loss account of £15,989-4-5. Against this sum are chargeable:—Commission on profits to estate managers and Secretaries, interest, discount on bills, &c., and interim dividend at the rate of 6 per cent. per annum for the six months ended 31st May, 1901, paid to the preference shareholders on 15th June, 1901, which total £11,661-1-3, leaving a balance of £4,328-3-2. Out of this the Directors propose to pay a dividend at the rate of 6 per cent. per annum on the preference shares for the 6 months ended 30th November, 1901, payable on Monday, 28th July, 1902, which will absorb £3,000 and leave a balance of £1,328-3-2 to be carried forward to the following year.

No new tea or coffee extensions are in progress or contemplated, but the planting of Cinchona is being continued through the existing cultivation in Travancore, and a few acres of specially suitable fresh land will be put out in 1902. The area of the Company's estates, which have now been practically all surveyed, aggregates 15,861 acres.

The estimates of crop for the current year are 2,962,480 lb of tea, 1,587 cwt. of coffee, and 239,500 lb of cinchona.

Efforts continue to be made to increase the consumption of Indian and Ceylon Teas elsewhere than in the United Kingdom, and more particularly in America and Russia, for both of which countries the Directors believe the teas produced by this Company's Travancore Estates are specially suitable. Producers in India have started an organisation for increasing tea-drinking amongst the native population, and it is hoped that in time an appreciable quantity will be consumed there. This scheme receives the support of the Directors, who are glad to report that some progress has already been made.

Owing to its former inaccessibility, and to the heavy expenditure which has had to be incurred in opening up communications, the development of the Company's large Concession in the Kanan Devan Hills, Travancore, has cost more than was originally expected. It was understood at the time planting operations were commenced in these Hills that the Government of His Highness the Maharajah of Travancore would construct a cart-road from the High Range to the plains, and thus afford direct communication to the port of Cochin which is about 86 miles from the Company's head-quarters at Munaar. After protracted negotiation, however, the Travancore Government declined for the present to proceed with the construction of the proposed cart-road to the west, owing to the cost being estimated by their chief engineer at so high a figure as £112,000. The Company was, in the circumstances, obliged to make its own arrangements for opening up communications, and this was done by the construction of a main cart-road and tramway for over 30 miles through the Concession to its eastern extremity, and by the erection of an aerial ropeway from that point (6,000 feet above sea-level) to a place called Kotagudi in the plains. From Kotagudi a cart-road 10 miles long was made to Bodinaikanur, one-third of the cost of which was contributed by the Government of Madras. There is a Government road from Bodinaikanur to Anmanaikanur Station on the South Indian Railway, connecting with Tuticorin, from which port the Company's produce is shipped. The Directors are glad, however, to be able to state that the Government of Travancore, although unwilling meantime to proceed with the western outlet, have agreed to contribute up to R400,000, or about £26,500 for the construction of a cart-road to the north to connect with the Madras Presidency road-system, and an agreement has been entered into whereby the Company has undertaken to make this road at a cost not exceeding the figure named. This road will be of great advantage in making the Concession more accessible and cheapening the cost of rice and other foodstuffs there.

The shareholders will notice from the accounts that the paid-up capital of the Company, as at 30th November last, was £360,000, and that the Block cost of the properties, which includes, of course, the expenditure by the Company on communications referred to in the preceding paragraph, amounted, as at that date, to £844,895 8s 9d. It is estimated that a further sum of about £120,000 will be required to bring the existing young cultivation to maturity, and to complete the equipment of the properties with factories, machinery, &c. The Directors, therefore, decided to issue the balance of the authorised Capital of the Company, namely, 15,000 Preference Shares and 10,000 Ordinary Shares. This fresh issue of Capital will, of course, be offered in the first place to the Shareholders of this Company, but the Directors are glad to be able to state that Messrs. James Finlay & Co. are prepared to take up, at par, whatever portion of the issue may not be subscribed for by other Shareholders, and to apply, so far as required, their cash advance to the Company, which exceeds £300,000, in meeting the amount due on the shares which may be allotted to them. To the extent of their cash advance so applied Messrs. James Finlay & Co. will take the position of shareholders instead of creditors of the Company.

The Directors propose to make a call of £2 per share on the ordinary shares already issued, of which due notice will be given. On the fresh issue of ordinary shares it is proposed that £3 per share should be payable on application and £3 per share on allotment, making the new issue also paid up to the extent of £6 per share.

The Directors regret to state that Sir John Muir, who has acted as Chairman of the Company since its formation, has been obliged to resign as member of the Board on account of the state of his health. They hope that after a time he may be able to again preside at their meetings. In the meantime Mr A K Muir, who was offered and accepted a seat on the Board, has agreed to act as Chairman. Mr Muir has been in India for the last eleven years, latterly as Senior Manager of the Calcutta Agents' firm, and has been connected with the management of the Company's estates since planting operations were commenced in Travancore.

In terms of the articles of Association, one of the Directors, Mr A B Murray, retires at this time. The Directors regret that Mr Murray, although eligible for re-election, finds it necessary to retire on account of ill-health, and they have considered the question of filling his place. They approached Mr D M Mannay, of Messrs Kelly & Co., Exchange Square, Glasgow, and he has expressed his willingness to be nominated for a seat on the Board.

The Auditors, Messrs Alexander Sloan & Co., C.A., retire, and offer themselves for re-election.

DUMONT COFFEE COMPANY, LIMITED.

DIRECTORS' REORT.

The Directors submit the general balance sheet and profit and loss account for the year ending 31st December, 1901.

	£.	s.	d.
The gross profit for the year, exclusive of £10,263 15s 7d brought forward from previous year, amonnted to	73,693	4	10
And the London charges were	3,314	11	7
Leaving a net profit of	70,378	13	3
Amount brought forward from 1900	10,263	15	7
	80,642	8	10
Interest at 5½ per cent per annum inclusive of income tax has been paid on the Debentures amonnting to £21,989. A payment of 2½ per cent inclusive of income tax was made on 1st Feb. 1902, on account of arrears of dividend on the preference shares £10 000. Ditto, ditto, was made on 1st July, 1902, on account of arrears ditto £10,000	41,989	0	0
Total	38,653	8	10
It is proposed to set aside for buildings and machinery the sum of	5,000	0	0
And to carry forward a balance of	33,653	8	10

At a later date, when more of the crop has been sold, the Directors hope to be in a position to pay a further dividend on account of arrears of the preference shares out of this balance.

The crop for 1901 has amonnted to 143,395 cwts., which is equivalent to the large yield of over 12 cwts. per acre of the coffee lands in hearing.

Of this quantity	103,615	cwts. were sold in London.
	14,645	do do in Santos.
	4,819	do do in New York.
	21,316	do were unsold at date of making up this account.
Total .. cwt.	143,395.	

The gross average price for the whole crop (including the portion unsold, which has been taken in the accounts at 30/ per cwt.), is equivalent to 38/8½ per cwt. landed in London, as against 40/2 per cwt. the previous year. The average price realised for the Company's pulped coffee, of which there were 39,362 cwt., was 37/5¼, and for the Company's unpulped coffee 32/3½.

The exchange rate for the milreis was again adverse to the Company's business, being 11 7-16 as against 10·44 the previous year; but, notwithstanding this, the coffee was laid down in London at 2/6¾ per cwt. less cost than in 1900.

The coffee crop from Brazil for the year under review was the largest on record, being 15,500,000

bags, as against 10,900,000 bags the previous year; and this, together with the crops from other countries, proving largely in excess of the world's requirements, caused a heavy fall in prices.

The Brazilian crop for the current season is expected to be considerably less than that of the past year, and the Company's estate manager estimates the yield from the Dumont property at about half that of the previous year.

The heavy crop that had to be dealt with necessitated the purchase of additional railway rolling-stock, and also an increase in the buildings on the Company's property, the expenditure on which has been charged to capital account.

Mr P R Buchanan, owing to prolonged absence in India, has ceased to be a director of the Company and the Board has elected Mr H K Rutherford to the vacant office of chairman.

It is with extreme regret the directors have to record the death of their colleague, the Hon H A Lawrence, who took the deepest interest in the affairs of the Company.

Mr H K Rutherford and Mr Stratton Boulnois retire on this occasion from the Board, and being eligible offer themselves for re-election.

The auditors, Messrs Jackson, Pixley, Browning, Husey & Co., also retire, and again offer themselves for re-election.

TEA COMPANY'S REPORT.

Empire of India and Ceylon Tea.—The directors, in presenting the accounts made up to December 31 last, state that the rainfall during 1901 was, in Assam, very short in the early months, and the weather was, on the whole, rather unfavourable for quality and outturn. In the Dooars it was favourable. In Ceylon the weather was generally unfavourable. The company's gardens in Assam obtained an average price of 7·87d., against an average price of 8·76d for the Assam Valley. Its gardens in the Dooars obtained 6·25d, as against an average for the district of 6·65d. The gardens in Ceylon secured 6·06, as against 6·15d for the district. Although one property in Assam was highly successful, on the whole results were disappointing, except in the Dooars group. On the Dooars gardens expenditure shows an increase due to the whole outlay on Tasati being charged to revenue. This garden is by no means in full bearing, and left a loss on the year of nearly £2,400, but it is confidently expected that it will be able to give a good account of itself henceforward. In Assam and Ceylon substantial savings were effected, but not sufficient to compensate for the fall in the price of tea. The Ceylon crop was short, and the board has again to record a loss on the working of the gardens. In the autumn of 1901 radical changes were made in the management, and while it was too late to expect good results in 1901 as a consequence of those changes, the board is fairly confident that 1902 will make a better record. So far the year shows an increase in output and a reduction in cost. The present low range of price is likely to promote the sale of Indian tea in markets outside the United Kingdom. The profit and loss account shows a balance of £9,292, to which must be added £5 536 brought forward from last year. The half-year's dividend on the preference shares held over from 1900 was paid in December, 1901, and the directors now recommend the payment of half the preference dividend due for 1901, £5,475, and that the balance of £3,879 be carried forward.—*H and C Mail*, Aug 1

SPANISH COCONUT OIL.—The *Gaceta de Madrid* of July 9th contains an order authorising the temporary admission of coconut or coprah for use in the manufacture of coconut oil, which must be exported within a maximum period of one year, through the Custom House of Barcelona, for the firm of Garcia and Co. of Sans. There will be a rebate of sixty per cent of the duty paid on coprah on importation.—*Chemist and Druggist*, August 2.

PLANTING NOTES.

CINNAMON.—The third quarterly auctions took place in Mincing Lane on Monday last when 800 bales were offered and 500 sold. The sale is reported to have passed off with fair competition. Notwithstanding this, however, unworked firsts and seconds are said to have fetched prices from 1d to 2d lower than in last sale.

SERICULTURE IN SIAM.—Siam is evidently intent upon improving her sericulture. Yesterday six Japanese men and two women, all experts, recommended to the Siamese by the Japanese Government, arrived by the ss. "Kawachi Maru" *en route* for Bangkok, having been engaged for a term of years. Certain districts of Siam are extremely favourable for the cultivation of the silkworm, the rearing of which would seem to be an employment well suited to the lethargic habits of the Siamese.—*Straits Times*, Aug. 4.

SHOOTING IN CEYLON: A GOOD BAG.—Ceylon is not yet by any means depleted of the big game necessary to provide a good day's hunting such as was enjoyed in the old days when the planter "led a glorious life of a pioneer hunter on the threshold of paradise." Messrs. Tranchell and Dickson's experiences at Panawa, in the wilds of the Batticaloa district, prove this to be the case. Mr. Dickson has had a unique and exciting experience, but apart from that little affair of his with a wounded and infuriated bear; the sport was excellent and the bag obtained sufficient to turn other Ceylon hunters green with envy. Such bag should be the means of attracting sportsmen to the Island, especially in view of the failure of the grouse prospects on the Scottish Moors!

OLD KING COFFEE.—In view of the frequent mention of coffee in our columns recently, in connection with the affairs of the Dumont Company in which Ceylon men hold large shares, and with the enterprise carried into the Far Eastern Colonies also by Ceylon planters, it will be of interest to read what is said of the prospects of our old staple nearer home. Not a few of our old planters have found a home in Southern India, where the outlook seemed bright at one time. There has been, unhappily, a change for the worse; and this is what an Indian paper of recent date says:—

"The decline in the Indian coffee industry is strikingly shown by the latest published figures. The average production of the last five years was under 20 million pounds, as compared with 34 million pounds in the preceding five years, and the quantity produced last year was less than half the quantity produced ten years ago. The cause of this decadence is the severe competition of Brazilian coffee, and the absence of a domestic market. The exports, apparently, exceeded the production during the past ten years, but this discrepancy is explained by the greater accuracy with which the export statistics are kept. The United Kingdom and France take between them considerably more than half of the total output of Indian coffee; and the state of the industry may be judged from the fact that, since 1897, the London prices have decreased more than fifty per cent. In view of these figures, observes the Lahore paper, there seems no escape from the conclusion that coffee is a doomed industry in this country."

THE TEA INDUSTRY IN CEYLON AND THE SUPPLY OF FUEL: A SERIOUS PROBLEM OF THE NEAR FUTURE SOLVED BY THE SUCCESS OF FUEL OIL.

In not a few districts in Ceylon there is no more serious question facing the planter than his future supply of fuel. Scarcity and high prices have already made themselves felt severely in not a few cases, and practical men have been shaking their heads over the prospect, more especially where fuel for "power"—for the steam engine furnace—has to be provided as well as for the tea dryers. We are aware that in one or two instances, at rare intervals, oil for steam engine fuel has been used on plantations, just as it is at the electric works in Kandy and in most of the Railway workshops upcountry. But it was a much more delicate matter to experiment, and decide, on the fitness of the fuel oil for tea-drying purposes. The "Shell Company" and their local Agents, Messrs, Delmege, Forsyth & Co. (who have long been considering the question from a business point of view) deserve credit for going to work after a very practical fashion to secure the necessary solution. An Engineer of the Company—an expert in all that concerns the use of oil fuel—has for some time been making a series of experiments at the Galaha Factory along with the capable Manager, Mr. W. M. Hall, and we are now informed that these have been crowned with success, as may be judged from the following statement which has been placed at our disposal:—

FUEL OIL FOR TEA DRYERS.

It is a well-known fact that in certain districts, Ceylon Tea Growers have almost exhausted their supply of firewood, and in the near future will find it a difficult matter to keep their dryers running on account of an insufficient and inferior supply, with eventually a total lack of firewood. Comparatively few are, however, aware that liquid fuel can be used in lieu of firewood, and it is said even at less cost, and Tea Planters will certainly be glad to learn that extensive experiments in the burning of fuel oil in Jackson's Tea Dryers have been carried on at the Galaha Factory during the last two months with very gratifying results. The steam jet system is that used; while absolutely no alteration is required in the furnace. The burner is placed on the front of the furnace on trunnions, and can be swung out of position at a moment's notice when the furnace is again ready for solid fuel. The oil tank can be placed at any convenient place in or near the Factory. One man only is required to work the whole arrangement. After testing several burners, that of "Rusden and Eeles No. 00" has proved to be the most economical and suitable for this class of work. The fuel used was Borneo oil supplied by the "Shell" Transport and Trading Co., and the amount of fuel consumed on an average of a long series of tests was rather less than six gallons per hour, actual tea drying being carried on during the whole of the experiments. The manager of the Galaha Factory, W. M. Hall, Esq., will be pleased to show the burning of the fuel oil at the Factory to any interested in it, if due notice is given. In anticipation of a great demand for fuel oil, Messrs. Delmege, Forsyth & Co., the Agents, are erecting storage tanks at several of the centres.

As to the cost, Mr. Hall estimates that with firewood costing R2 per cubic yard, his tea-drying costs ·75 cents per lb., and he feels sure that with the fuel oil he can do the work as, if not more, cheaply. This is extremely satisfactory, because the delivery of the fuel can be made more economically to estates close to a railway station, say for instance at Hatton, Kotagala and Talawakele—three centres where we believe fuel to be scarce—than at Galaha with the many miles of cartage involved. Tanks are at once to be erected at convenient centres and portable iron cases are to be substituted, for wooden casks so apt to leak, for the transport by rail, with a suitable package to carry on coolies' heads where there are no cart roads available. Another great advantage of the new system is the equality of temperature for drying that can be maintained; whereas with firewood as the teamakers know, this is a very difficult matter. Altogether, then, it must be confessed we are here face to face with a very notable improvement and advance in connection with tea factories, and we may well prophesy that no long period will elapse, before the use of fuel-oil for tea-dryers will become almost universal in the hill-country of Ceylon; while, in many cases, it will also be used for the furnaces of plantation steam engines. It must be remembered that the Galaha experiments only apply to Jackson's dryers; and in this connection it may be noted that Mr. Jackson himself has invented an air-injector for oil-fuel, which is necessary where there is no steam used. But we have no doubt that the makers of other dryers—of the Siroccos and Brown's Desiccators—will be keenly alive to the application of the new fuel to their inventions. Planters, after satisfying themselves of the wisdom of the change, must, of course, apply to their engineering advisers to get the needful adaptations made, whatever be their style of dryer, and a start in this direction need not be delayed from any fear that the fuel-oil required, will not be available, as there is always an ample stock for all requirements in Colombo.

MR. HART AND THE TRINIDAD ROYAL BOTANIC GARDENS: NEW KINDS OF RUBBER; GRAFTING CACAO.

As usual, Mr. Hart's Annual Report (from April, 1901, to 31st March, 1902) is both full and very interesting. We have marked all that is of most value to planters and horticulturists in full, and meantime would say that an experiment in Bee-keeping (Italian Queens being introduced) is likely to prove very successful and generally useful. We cannot understand why an attempt at bee-keeping is not made in the Henaratgoda Gardens: there are two Ceylon honey-making bees worthy of attention. We dare say Gangaroowa will first show an experiment. Mr. Hart has a good deal to say about Rubber. His Castilloas are seeding freely, and the seed is good, but it has "a very fugitive vitality, and even with the best packing it is very difficult to send it long

distances in good order." Seeds from Para Rubber trees, growing far and high up in the interior (possibly a new variety); is attracting attention. West African "Silk rubber," *Funtumia elastica*, trees are making splendid growth. Trees not four years old are over 20 feet high with stems 12 inches in circumference. Landolphias (creepers) are grown against the Indian rain tree, *Pithecolobium Saman*, and give excellent rubber fluids which easily coagulated. Mr. Hart is succeeding with the camphor tree, citronella grass, various fibre plants, peppers, vanilla, clove, cinnamon, ginger, kola, &c. He is strong on the value of *Erythrina* (Immortelle) as shade for cacao, and the flowers are said to have a high nitrogenous value. With various fruits—mangoes, oranges, mangosteens, lemons, plantains, &c.—Mr. Hart is experimenting with more or less success. His coffee hybrids are turning out well and are favourably reported on from Mincing Lane; but nothing is said as to their being proof against the fungus, *hemileia vastatrix*. Mr. Hart pays special attention to his cacao section, and new varieties—one from Venezuela and *Theobroma pentagona*—are doing well. He is a strong believer in the value of grafting cacao of the best kinds and feels sure this will result in samples of fruit far superior to any now seen. So Mr. Herbert Wright will have to hurry on at Gangaroowa and show how a plot of grafted cacaos of the best kinds—from strong, large trees with heavy crops and large beans—are to do in Ceylon. For fuller information of valuable experiments in Trinidad we can only refer to September's *Tropical Agriculturist.*

HORTICULTURE IN NUWARA ELIYA.

A VISIT TO MR. JOHN COTTON'S ORCHARD.

The pride of Mr. Cotton's orchard just now is the single apple (of the size of an orange) known as the Kentish Fill Basket, on a tree about 7 feet high, which Mr. Cotton a few years back got from Mr. A.J. Kellow of Albion, Nuwara Eliya, and planted about his orchard till at last it seems to have got placed in proper soil and is now rapidly growing into a big tree. Mr. Cotton has just imported plants of the Beauty of Stoke, Boston, Russet, and Emperor Alexander; these have all been set about two weeks last Friday, and to all appearances have started to grow. Mr. Cotton hopes soon to have plants of all the varieties to sell.

CHERRIES.—The latest varieties have been imported and set during July, among them Purple Jean, Waterloo, Florence and the Verdus (black variety) all striking new buds famously. Mr. Cotton's experienee with imported eherry plants is wide.

PLUMS.—The success which has attended the Red Heart Plum of which several hundred fruits weighed down the many trees both last year and this year, and the propagation of cuttings being alike successful and easy—the result has eneouraged Mr. Cotton to experiment with the Golden Drop, Diamond, General Hand, Orleans, General Sago, an d the Golden Heart. The orehard has just now in bearing the Ootaeamund and Kelsey beside the Golden Heart. The sale of the Red Heart Plum plants has been a big one and the demand continues to increase. He would strongly recommend to every land-owner to plant out the Red Heart Plum—those in the writer's yard, barely two years, are just now in flower and grown without much fussing or care.

ENGLISH GOOSEBERRIES.—Of these there are the green, red, white and yellow varieties growing in the orchard, and Mr. Cotton was kind enough to mention that this was his first attempt with Gooseberries, and he was quite certain that the plants, which were looking healthy and in fair growth for the short period they have been put down, were for the first time experimented with in Nuwara Eliya.

CURRANTS.—Red and white; these plants put down during the middle of last season came to fruit early this year and had a few springs on them, much to Mr. Cotton's delight. The plants are now coming on rapidly, and Mr. Cotton expects to be able in a few months' time to graft cuttings of all the above varieties for anybody wanting to plant out these fruits about their homes.

ORRANGES.—The imported plants of last year are doing well and young plants from these will be available by the end of October. Just now a few plants are on hand, which await booking. That further sucess may attend Mr. Cotton is the wish we express heartily; for, he is a resident worthy of the clime he has decided to live in for so many years past.—*Cor.*

A DISEASED OR DIRTY "GARDEN'S" ACT FOR CEYLON.

Ever since in 1869 we saw farm fields in Tasmania, nicely enclosed by stone walls or dykes, but in some cases, bearing one continuous crop of thistles, from wall to wall, and learned that a Thistle Act had to be passed in the Colony to deal with such cases, we have, from time to time, pointed out the need of a similar Ordinance in Ceylon. At one time "white weed" on coffee estates was the great trouble—one neglected dirty property imperilling its neighbours and causing heavy expense; but who hears much of "white weed" now. Other weeds have in many districts superseded it, just as lantana is so freely losing ground upcountry. Now a-days, it is the cacao planter who specially wants protection, and that very much from native neighbours who will not deal with, or destroy, their diseased trees, from which the fungi or other enemies freely spread. Most applicable, too, would such an Ordinance be to the case of neglected coconut gardens. We have had expensive personal experience in this direction. The owner of a well-tended garden of palms, dies; it falls into as indifferent hands, gets quite neglected, and becomes a regular breeding-place for beetles which, of course, fly over into the adjoining gardens. In such a case a law giving adjacent owners, the power, after due intimation, of entering and destroying beetle-infested palms, or corners full of illuk-grass, the expense to be a first charge on the property,—would seem to be equitable. The same applies exactly to the case of diseased and neglected cacao gardens; and in both cases, there could be an official inspection and report—Mr. Carruthers, Mycologist, and Mr. Green, Entomologist, being available—before due notice was given, and failing redress, action taken at the expense of the owner.

PLANTING FORTY YEARS AGO.*

A FEW REMINISCENCES BY ED. *T.A.*

Our first inspection of a coffee estate was of Aliwetenatenne in the Medemahannwara district; that was in 1864. The owner—a Mr. Turner—had died suddenly, and being in Kandy, Mr. Richard Rudd invited us to a drive to Teldeniya and a ride thence up to the far-famed Gap in the Eastern mountain range, near the spot where the last King of Kandy was captured in 1815. *En route* we were stopped by cherry "Ned Mortimer"—then in his prime—who shouted "Come and see 15 cwt. of coffee (cherries) per acre on Rajawella No. 2" At our journey's end we were met by Mr. Richard Burke (then quite a young planter) who begged the owner to come and inspect the finest coffee clearing in the island on Angruwella in Rangalla district.

The following week we accompanied "Abercromby Swan" to "Vicarton" and "the Borders"—to inspect his line coffee, clean estates and crops of "Sepoy Coolies" in West Matale. "A rupee for every weed you pick up in my fields" was his triumphant challenge to visitors. James Grant (John had begun pioneering in Travancore) Donald Bain and John and Charles Forbes were neighbours;—(but we are merely giving a skeleton sketch; details and incidents must await the future Autobiography?) We rode across to Elkadua, up by Sylvakande where we encountered Edward Young, riding down from Kellebokka on a big horse which threatened to kick our pony into the ditch; looked in on D. Watson on Dambulagalla; had a grand afternoon outlook over *the Valley* (a picture of green framed by the everlasting hills), got to D. Webster on Wattekelly; and then made the round of the Knuckles and Rangalla. Heigho! what grand shows of coffee everywhere; and what bright ardent spirits among the

KNUCKLES BRICKS!

Is there any one of them left in the island now—save Mr. Channing Esdaile who is revisiting his Madulsima property?

Next year 1865 found us in the wake of Sir Hercules Robinson on his memorable tour through Uva and Sabaragamuwa, the veteran Major Skinner piloting the new Governor and bidding farewell himself to scenes with which he had been familiar since 1825! Who can foreget the delight of the veteran head of the Public Works Department with the Farewell Address which the Haputale planters, headed by "clever Henry Don" presented to him (the best expressed Address he declared, he had ever read and he wished to know who was the writer:—'a feather', as we told the old Major ten years afterwads in England, 'in the cap of the young Sub-Editor and Reporter' who had been asked to draw it up!) Who remain of all who met Sir Hercules Robinson at Kalupahane in 1865, save R. E. Pineo (Colombo Club) A. Macphail, W. H. Wright and ourselves?

Next year (1866) brought a

BLACK FRIDAY

in London Overend Gurney & Co. down) and great depression in Colombo; so that £500 could not be raised in the Fort to buy an estate which a few years after sold for £5,000; and bushels of coffee were exchanged for as many bushels of rice to keep coolies from starvation.

Hard work was the order of the day during 1866-7-8; and our next trip upcountry was to visit "Logie Elphinstone" on Westhall and Macleod on Kudienlena, early in 1869. And what a delightful ride we all three had into

DIMBULA FELIX

as it was called—for, the Wilderness of the Peak was, comparatively, still *terra incognita*—Logie and Belgravia were then the farthest estates, with a 50-acre clearing in Matakelle as an excuse for sport; and all the region beyond up to the Gorges and the foot of the Bopats was "Sporting Reserve' never to be cultivated! Dimbula now counts 50,000 acres in cultivation out of 55,000 in private hands. In 1869, only 8,000 acres were opened—much of it newly burnt off as we saw it—and only 20,000 acres in all had been taken up. Forest, forest everywhere: our ride through forest from Forest-creek to New Valley, Dikoya, was declared to have its risks—bad fords, or rotten wooden attempts at bridges, perhaps a prowling elephant, or the chance of getting bogged in a morass in some of the gullies below Kotagala. But our chief enemy proved to be heavy persistent rain. [This was again the case on crossing from Dimbula to Dikoya, in 1872, when we were glad to accept Mr. Stopford Sackville's hospitality at Drayton and pass a pleasant forenoon with him, the late Walter Campbell, one of the Camerons and John Buchanan now in Brazil.] In 1869 Dikoya and Maskeliya (the latter with four blocks sold) had only 6,000 acres cleared: S. Le Cocq and T. R. Dobree were chuckling at the foolish rush into the region beyond; they had had enough of rain] and were soon after off to select land, the one in Morawakkorle and the other Nitre Cave!

The land was all before them
Where to choose,—

and they left behind them Bogawantalawa, the Agras and the best of Maskeliya, to fix on two of the poorest spots in our hill-country. But then the old Demerara coffee planter Sir Wm. Reid (who for himself in 1840, selected Spring Valley, the finest block in Uva) after passing through and rejecting Haputale, fixed on a corner of Rakwana for his nephew Charles Shand's future coffee plantations!

Where are the Dikoya men of 69—James Mac Donald, the cheetah-slayer, L. H. Kelly, Sillery, Mackinnon, Davidson, MacLellan of the bagpipes, Reid? Two only remain in Ceylon, we believe, Giles F. Walker who was superintendent on Del Rey, and D. W. H. Skrine who managed his own compact Warleigh property of 120 acres planted, a perfect "gold mine" in coffee. And yet poor Dobree and Lecocq with all their Dikoya experience, would not touch, but rather an away from such land! As for Maskeliya, there were only four blocks taken up in 1869, the pioneer being Tom Gray with Bunyan and Ovoca. Time and space fail us to record here any of the many planting adventures of those early days before roads and bridges came ino existance. There were

'scapes by flood and field,—

and there were actual fatalities—deaths by drowning in trying to cross the Dikoya river in monsoon

---

* The hypercritical will say, that means 1862 and ED. "*T.A.*" though he arrived in 1861, never saw Kandy or a coffee estate till 1864! It was Dr. Johnson who retorted on the old lady—who found fault with his saying a certain pear-tree was "loaded with fruits," because she had counted and there were only 40 pears—"Od's Madam would you have us swear to the truth of a song!"

floods; while "Pedigree" Banner got his name after a narrow squeak of a raft capsizing with himself and two companions and because one of them risked his life to recover a valuable paper in an overcoat pocket, which turned out to be (not a title-deed but) a copy of the "Liverpool Mercury" with the pedigree of his family. The disgust of the rescuer may be imagined! Then there was poor old Noad, Chief Surveyor, under Colonel Fyers, S. V. G., nearly starved under Adam's Peak living on the coolies' rice for weeks together, while his supplies were stopped by three rivers all in flood, and rendered impassable. Well may the present generation of planters between Adam's Peak and Great Western (is there anyone left who was in the same region in 1869, besides the two named above?) be told by us:—

If you had seen these roads
Before they were made,
You'd have held up your hands
And blessed General Wade!

It was in 1869 that we collected, for the first time, the *planted* acreage of each estate: Meddecumbra with its thousand acres of coffee was the biggest by far in the young districts: Del-rey had 290, Kirkoswald 287, Warleigh and Newton each 120; Bearwell was all forest; Palmerston and Belgravia each 100 acres and so on.

Our next big planting trip was in 1872. Starting from Galle for the newly-opened Morawak-korale district to visit Le Cocq and his sinnedurais, A. E. Scovell and A. T. Rettie; across Gongalla through Rakwane, riding from Pelmadulla right through Haputale, Badulla and Passara districts; back to New Galway and Nuwara Eliya and thence by the Kiklimaana bridle road through the forest to Upper Dimbula, represented chiefly by Lousa and Scalpa. Of the country as it then appeared, of incidents and adventures, much might be said (we pencilled the draft of the Memorial that started the agitation for railway Extension from Nawalapitiya to Nanuoya and Haputale, while lying on the patna in front of the old Bandarawella rest-house, on this trip); but we must not tire our readers and have said enough for today.

Trusting to our memory—which is probably with advancing years, not so good as it once was—we find we made several omissions of importance in our instalment of Reminiscences published on Friday last. One is simply unpardonable; for it was to the hospitable bungalow of Mr. and Mrs. W. D. Gibbon at Hoolankande that we turned our pony, when we first entered the Kellebokka valley in 1864; and it was then, if we recollect aright, that we accompanied Mr. Gibbon and Mr. Charles Catto on a very notable jungle expedition across the Knuckles range to take stock of a new experiment in planting on the Eastern spurs and slopes—an experiment which it would have been well for Mr. Gibbon if he had never touched. (But of how many more can that be said as to Planting on the Lagalla side:—Poor Ted Hope and Wingate, Thomas Mackie, Borron and many more who lost much money in vainly trying to make plantations pay in wind-blown districts.) Another visit to the same veteran planter, when he became Manager of Oodoowella, first made us acquainted with

THE HANTANNE DISTRICT.

The romantic history of the first estates planted; the tragedies connected with the deaths of Henderson, Urquhart and Falconer; and the still more harrowing murder by Sinhalese villagers of the young Welshman, Morgan, when riding with the monthly bag of rupees through a bit of jungle before bursting out on the patnas of Kitoolamoola, would fill up much more than a column it space and time permitted. A. C. Mortimer as Manager for Sir John Cheape's group of estates was the great gun of the district, and he was succeeded by Wm. Cameron and James Beaton. Old Gottelier on Peradeniya and Paul de Chermont—with the grand old giant rose-tree on Ooroogalla—were characters in their way; and altogether there are many pleasant reminiscences of Hantanne in the early days, as there is respecting the

HEWAHETTES

which we first entered by the old road from the top of the Kandy Lake to get to Kirrimettia, Bowlane, Bopitia, Patiagama, etc.—the ground being nearly everywhere strewn with coffee—bumper crops and scarcity of coolies accounting for much cherry lost. Then Dr. Dodsworth, proprietor of Kirrimettia, who dated from "the forties," rode down with us to pay our first (but by no means last) visit to the

PATRIARCH OF DUMBARA,

the late Robert Boyd Tytler, regarding whom and his work as Pioneer of Coffee and Cacao how much could be told!

We regretted at this time not to be able to visit

DOLOSBAGIE

and look up Mr. Wm. Rollo (who had just—1864—got a young Assistant in Mr. C W Horsfall, now our neighbour in Baillie Street); while his planting neighbours then included Messrs. John Stephens, J A Bell, Henry Saunders, W C Whitham, R B Downall, Blacklaw, Imray, James Blackett, G M Ballardie, R Porter Wm. Taylor, etc. We had to wait some years before we saw one corner of the district with Mr. T. Smith at Barnagalla.

Still another early trip that should not be forgotten was that with Mr. Andrew Cross from Nuwara Eliya into Maturata to be the guest of Mr. J. H. Renten and thence to ride back into Udapussellawa and visit our old friend Mr. G. A. Dick on Ragalla, then being opened. Still earlier, of course, was our acquaintance with Mr. Dick when Manager of Nayapane in

PUSSELLAWA,

while Maurice Worms ruled over Rothschild; F. R. Sabonadiere was a little King at Delta, and had for genial neighbours, such good men and excellent planters as old George Shireff on Helbodde, John Lewis Gordon on Wavendon (afterwards and still partner in Messrs. Geo. Steuart & Co.), John Martin on Sir Horace Rumbold's estate of Melfort, W. Sabonadiere on Glenloch. Northmore on Whyddon, Sweeting on Kallugalla, Capt. Donald Graham on Mahavilla (to be succeeded later by Wm. Mackenzie), and the Bowden Smiths in

NILAMBE.

To that district we made a most pleasant trip with Old Colonist when he was doing double duty as V. A. for Messrs. Geo. Steuart & Co. as well as for Lee Hedges & Co. when (as Price and Boustead's Agents) they held a long list of estates in Agency. Of the Wariagallas under Henderson and Arthur Davidson, and of E. S Grigson, as a young planter opening his first clearing of 100 acres of beautiful young coffee on Nilambe estate, we have most pleasant recollections; as also of C. S. Armstrong on Morahena. But we must close what is after all little more than a preliminary sketch.

Monthly Shipments of Ceylon Black Tea to All Ports in 1901-1902.

(Compiled from Chamber of Commerce Circular.)

	UNITED KINGDOM.		RUSSIA.		CONTINENT OF EUROPE.		AUSTRALIA.	
	1901. lb.	1902. lb.	1901. lb.	1902. lb.	1901. lb.	1902. lb.	1901. lb	1902. lb.
January ..	12617540	9056013	727093	612958	104240	151984	740574	714247
February	8333266	7455219	...	919709	135811	121158	1778987	1020948
March ...	7932090	8198179	1288010	896513	82055	91081	2012070	1713916
April ..	8474940	8521388	1297873	988698	111082	93198	2245142	2081904
May ..	10570686	9638555	937138	238239	63310	80669	1644160	2000522
June ..	11425044	12563050	835711	1984976	93699	166479	1730886	1828695
July .	8488409	10724781	700557	1779011	189567	108785	2593243	1747960
August *..	6030406		949747		82595		1612929	
September	6093129		485429		74896		1779523	
October .	8989024		762616		181891		1840192	
November	6229472		1018996		190988		1539370	
December	12235867		830226		189520		990563	
TOTAL ..	105,497,339		9,699,734		1,539 986		20.638,208	

	AMERICA.		ALL OTHER PORTS.		TOTAL.	
	1901. lb.	1902. lb.	1901. lb.	1902. lb.	1901. lb.	1902. lb.
January	138235	125795	275598	389215	14603250	11050212
Febuary	272221	115332	453774	385795	10974059	10018071
March	510734	566263	350874	311191	12175833	11777143
April	10030	807390	226776	290137	12365843	12782715
May	288333	242651	306644	436410	13810271	12637046
June	276827	403005	404687	714471	14766854	17660676
July	442100	464858	669163	846036	13083039	15671431
August	266787		227578		9170042	
Septembr	214779		388213		9035969	
October	115545		273928		12163196	
November	504614		183124		9666564	
December	313534		366244		14875954	
Total ...	3,704,335		4,549 627		145,188,244	

Monthly Shipments of Ceylon Green Tea to all Ports in 1901—1902.

	UNITED KINGDOM.		RUSSIA.		AUSTRALIA.	
	1901. lb.	1902. lb.	1901. lb.	1902. lb.	1901. lb.	1902. lb.
January	...	64021	...	..	...	...
February	...	24839	..	4420	...	...
March	75583	14800	...	24210	...	..
April	13016	13676	...	8000	...	...
May	33889	70103	...	..	1714	..
June	12814	87340	..	74225	...	...
July	4478	40574	...	..	...	...
August	...		..	..	...	...
September	5945		...	..	...	...
October	12921		..	..	...	..
November	16540		5615	..	...	..
December	15255		38547	..	1262	..
TOTAL ...	237.231		44,162	...	2,976	...

	AMERICA.		ALL OTHER PORTS.		TOTAL.	
	1901. lb.	1902. lb.	1901, lb.	1902. lb.	1901. lb.	1902. lb.
January ...	...	113332	..	...	...	177353
February ...	...	26480	...	515	..	56254
March ...	227889	62313	12173	100	315660	101423
April ...	79403	53610	7365	9165	99784	84451
May ...	65980	32676	1454	3280	103037	106059
June ...	23046	84184	...	4500	35860	250249
July ...	46896	194016	...	...	51374	234590
August ...	12260	...	...	...	12260	..
September ...	15304	...	...	..	21249	..
October ...	28560	..	...	..	41481	...
November ...	36296	..	...	...	58541	...
December ...	11786	...	7612	...	27011	..
TOTAL ...	797.796	...	28,609	..	11.10774	...

* It is impossible to get the figures for the last month in time for publication; but see pages 210, 211 for certain information.

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transactions.
Agra Ouvah Estates Co., Ltd.	500	825 x.D.	..	—
Ceylon Tea and Coconut Estates	500	..	—	—
Castlereagh Tea Co., Ltd.	100	..	..	—
Ceylon Provincial Estates Co. Ltd.	500	500	..	—
Claremont Estates Co., Ltd.	100	—	—	—
Clunes Tea Co., Ltd.	100	47½	...	50
Clyde Estates Co., Ltd.	100	2[illegible]	—	—
Doomoo Tea Co., of Ceylon Ltd.	100	..	—	...
Drayton Estate Co., Ltd.	100	—	..	—
Ella Tea Co., of Ceylon, Ltd.	100	30	—	—
Estates Co of Uva, Ltd.	500	200	...	200
Gangawatte Tea Co., Ltd.	100	—	—	—
Glasgow Estate Co., Ltd.	500	—	—	—
Great Western Tea Co., Ltd.	500	575	—	—
Hapugahalande Tea Estate Co.	200	—	—	—
High Forests Estates Co., Ltd	500	475	500	—
Do part paid	400	—	...	...
Horrekelley Estates Co Ltd	100	85	—	85
Kalutara Co., Ltd.,	500	—	..	—
Kandyan Hills Co., Ltd	100	—	40	—
Kanapediwatte Ltd.	100	40	45	—
Kelani Tea Garden Co., Ltd.	100	..	35	—
Kirklees Estate Co., Ltd.	100	—	—	100
Knavesmire Estates Co., Ltd.	100	...	45	..
Maha Uva Estates Co., Ltd.	500	—	350	—
Mocha Tea Co., of Ceylon, Ltd.	500	700	—	—
Nahavilla Estate Co., Ltd.	500	..	300	—
Nebeda Tea Co., Ltd.	500	—	...	—
Palmerston Tea Co., Ltd.	500	...	400	—
Penrhos Estates Co., Ltd.	100	—	—	—
Pitakanda Tea Company	500	—	...	—
Pine Hill Estate Co., Ltd.	60	—	40	30
Putupaula Tea Co., Ltd.	100	...	..	—
Ratwatte Cocoa Co., Ltd	500	.	—	—
Rayigam Tea Co., Ltd.	100	35	...	—
Roeberry Tea Co., Ltd.	100	—	85	—
Ruanwella Tea Co., Ltd	100	...	30	—
St. Heliers Tea Co., Ltd,	500	...	—	—
Talgaswela Tea Co., Ltd.	100	...	...	17½
Do 7 per cent Prefs.	100	—	—	—
Tonacombe Estate Co., Ltd,	500	300	...	—
Union Estate Co., Ltd.	500	..	110	—
Upper Maskeliya Estates Co., Ltd.	500	500	—	..
Uvakellie Tea Co., of Ceylon, Ltd	100	...	—	—
Vogan Tea Co., Ltd.,	100	45	50	..
Wanarajah Tea Co., Ltd.	500	..	9[illegible]0	—
Yataderiya Tea Co., Ltd.	100	—	275	..

CEYLON COMMERCIAL COMPANIES

Company	paid p. sh.	Buyers.	Sellers.	Transactions.
Adam's Peak Hotel Co., Ltd.	100	...	30	...
Bristol Hotel Co., Ltd.	100	..	110	...
Do 7 per cent Debts	100	—	...	..
Ceylon Gen. Steam Navigation Co., Ltd	100	—	250	—
Ceylon Ice & Cold Storage Co. Ltd.	100	..	115	115
Ceylon Superæration Ltd.	100	—	40	—
Colombo Apothecaries' Co. Ltd.	100	—	125	132½
Colombo Assembly Rooms Co., Ltd.	20	15	..	..
Do prefs.	20	...	..	...
Colombo Fort Land and Building Co., Ltd.	100	—	80	...
Colombo Hotels Company	100	...	.	280
Galle Face Hotel Co., Ltd.	100	190	200	—
Kandy Hotels Co., Ltd.	100	..	130	—
Kaluganga Nav. Co. Ltd.	60	...	60	—
Mount Lavinia Hotel Co., Ltd.	500	—	300	—
New Colombo Ice Co., Ltd.	100	..	—	75
Nuwara Eliya Hotels Co., Ltd.	30	—	27½	27½
Do 7 per cent prefs.	100	—	—	—
Public Hall Co., Ltd.	20	...	—	—

LONDON COMPANIES

Company	paid. p. sh.	Buyers.	Sellers.	Transaction.
Alliance Tea Co., of Ceylon, Ltd.	10	..	—	..
Anglo-Ceylon General Estates Co	100	...	55–60	—
Associated Estates Co., of Ceylon	10	..	1½–2½	—
Do. 6 per cent prefs	10	..	3–5	—
Ceylon Proprietary Co.	1	.	¼–½	..
Ceylon Tea Plantation Co., Ltd.	10	..	23¼–24	...
Dimbula Valley Co. Ltd	5	..	5–5½	—
Do prefs	5	—	5–6	...
Eastern Produce & Estates Co. Ltd.	5	...	3½–3¾	—
Ederapolla Tea Co., Ltd	10	...	6–8	...
Imperial Tea Estates Co., Ltd.	10	...	4 4½	—
Kelani Valley Tea Assen., Ltd.	5	...	3–5	—
Kintyre Estates Co., Ltd.	10	...	6–8	—
Lanka Plantations Co., Ltd	10	..	4	—
Nahalma Estates Co., Ltd.	1	...	nom	..
New Dimbula Co., Ltd.	1	...	2¾–3	..
Nuwara Eliya Tea Estate Co., Ld.	10	—	—	10
Ouvah Coffee Co., Ltd.	10	..	6–7	—
Ragalla Tea Estates Co., Ltd.	10	.	11–13	—
Scottish Ceylon Tea Co., Ltd.	10	—	10–15	—
Spring Valley Tea Co., Ltd.	10	...	2–5	—
Standard Tea Co., Ltd.	6	..	10–12	..
The Shell Transport and Trading Company, Ltd.	1	...	2⅞–3⅛	... —
Ukuwella Estates Co., Ltd.	25	—	par	...
Yatiyantota Ceylon Tea Co., Ltd.	10	—	5½	..
Do. pref. 6 o/o	10		9–10	...

BY ORDER OF THE COMMITTEE.

Colombo, Sept 5th, 1902.

* Latest London Prices

RAINFALL RETURN FOR COLOMBO.

(Supplied by the Surveyor-General.)

	1897.	1898.	1899	1900	1901	Av. of 32yrs.	1902
	Inch	Inch	Inch.	Inch.	Inch	Inch.	Inch
January ..	3·81	2·32	·98	3·72	11·91	3·51	1·95
February ..	1·68	1·98	2·78	0·63	3·55	1·24	4·37
March ..	3·66	4·21	0·88	3·71	5·12	4·76	6·85
April ..	10·97	22·81	6·66	15·12	8·71	11·34	10·01
May ..	8·30	5·80	17·73	10·63	6·23	11·86	11·89
June ..	10·14	10·91	9·23	7·83	5·93	8·28	9·84
July ..	5·24	6·15	1·11	6·77	4·52	4·46	4·63
August ..	9·09	0·97	0·62	7·35	0·46	3·63	2·78
September ..	4·58	6·90	1·48	4·00	3·93	4·91	1·03*
October ...	4·71	20·60	12 99	9·47	3 91	14·03	
November ..	11·66	17·38	8·58	9·25	19·84	12·77	
December ..	8·89	3-05	4·44	5·20	1·70	6·26	
Total..	82·73	103·11	73·48	83·68	75·86	87·83	5[illegible]·77

* From 1st to 2nd Sept. 1·03 inch, that is up to 9·30 a.m. on the 3rd Sept.—ED. *C.O.*

CEYLON TEA: MONTHLY SHIPMENTS TO UNITED KINGDOM AND ESTIMATE.

Estimate	for	Aug.	1902—7 to 7½ mil. lb.
Total	Shipments	Do	1902—7,250,000 mil. lb.
Do	Do	Do	1901—6,030,406 lb.
Do	Do	Do	1900—7,568,667 lb.

[ESTIMATE for Sept. 1902—7 to 7½ million lb.]

THE DEAF HEAR.—No. 479 of *the Illustrated World* of 626, Chiswick High Road, London, W., England contains a description of a remarkable Cure for Deafness and Head Noises which may be carried out at the patient's home, and which is said to be a certain cure. This number will be sent free to any deaf persons senudig rheir address to the Edito

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

EXPORTS

Colombo, Sept. 1st, 1902.

CARDAMOMS :—
All round parcel, well bleached per lb. R1·10
Do. dull medium do. R0·90
Special assortment, 0 and 1 only do. R1·30
Seeds do. R1·05

CINCHONA BARK :—
Per unit of Sulphate of Quinine 7c—1½ to 3 per cent.

CINNAMON :—(in bales of 100 lbs. nett.)
Ordinary assortment per lb. 50c.
Nos. 1 and 2 only per lb. 54c,
Nos. 3 and 4 only per lb. 45c.

CINNAMON CHIPS :—(in bgs. of 56 lbs. nett. per candy of 560 lb.) R67·50

COCOA :—
Finest estate red unpicked per cwt R45·00
Medium do do R38·00
Bright native unpicked and undried R37·00
Ordinary do do do R28·00
} Prices nominal

COCONUTS—(husked).
Selected per thousand R49·00
Ordinary „ R42·00
Smalls „ R34·00

COCONUT CAKE—
Poonac in robins f. o. b. per ton R80·00
Do in bags none.

COCONUT (Desiccated).
Assorted all grades per lb 19c—Business done.

COCONUT OIL—
Dealers' Oil per cwt R17·50.
Coconut Oil in ordinary packages f. o. b. per ton R385·00.—Business at lower figure.

COFFEE.—
Plantation Estate Parchment on the spot per bus. None
Plantation Estate Coffee f. o. b. (ready) per cwt.—62 50.—Nominal.
Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—
Ready do per lb.—46c Little doing.

COPRA—
Boat Copra per candy of 560 lb. R55·00
Calpentyn Copra do do R56·50
Cart do do do R50·00
Estate do do do R56·00

CROTON SEED per cwt—R11·00

EBONY—
Sound per ton at Govt. depot—R175·00.—Sales of the 4th August,
Inferior R95·00.

FIBRES—
Coconut Bristle No. 1 per cwt None
Do „ 2 None
Do mattress „ 1 None
Do „ 2 None
Coir Yarn, Kogalla „ 1 to 8 15·00
Do Colombo „ 1 to 8 R11·00.—Fine qualities steady, others lower.
Kitool all sizes None
Palmyrah None

PEPPER—Black per lb None

PLUMBAGO—
Large lumps per ton R600
Ordinary lumps do R600
Chips do R350
Dust do R250 Prices nominal
Fine qualities very scarce.
Do (Flying) do R125

SAPANWOOD— per ton None

SATINWOOD (ordinary) per cubic ft. None
Do (Flowered) per cubic ft. None

TEA—	High Grown Average	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	62	47	32
Orange Pekoe do	51	39	31
Pekoe do	43	34	26
Pekoe Souchong do	37	22	23
Pekoe Fannings do	40	27	25
Broken mixed—dust, &c	26	21	21

CEYLON EXPORTS AND DISTRIBUTION FOR SEASONS 1901 AND 1902.

COUNTRIES	Black Tea 1902 lbs	Black Tea 1901 lbs.	Green Tea. 1902 lbs.	Green Tea. 1901 lbs.	Coffee—cwts. Plantation	Coffee—cwts. N'tive	Coffee—cwts. Total	Cocoa cwts.	C'moms lbs.	Cinnamon Bales. lbs.	Cinnamon Chips. lbs.
To U K. ..	2260657	7135826	365392	139800	5492	-	5492	24463	250767	231015	125812
„ Austria ..	33619	38495	..	..	1	..	1	...	...	5600	36400
„ Belgium ..	50030	13166	...	..	95	..	95	475	...	72000	111440
„ France ..	148242	19010	—	..	4	...	4	609	448	35600	11592
„ Germany ..	445222	290977	...	..	26	..	26	3625	89559	461281	8878 3
„ Holland ...	4434	15589	...	..	...	..	..	..	..	25000	158200
„ Italy ..	13134	8681		..	...	..	..	32	435	155418	88312
„ Russia ..	220252	6179059	106435	..	8	...	8	110	448	130	..
„ Spain ..	3281	...	..	..	...	..	..	31	..	195495	64832
„ Sweden ..	53205	31304	...	..	..	..	..	410	...	..	..
„ Turkey ..	19124	27269	..	..	...	...	..	..	..	..	...
„ India ..	619146	9 7335	17331	16124	68	...	68	2	63577	...	2296
„ Australasia ..	2145196	14181100	..	1714	1818	14	1832	474	...	3624	20136
„ America ...	308578	1594022	668593	455484	820	...	820	7	2799	157000	6275
„ Africa ..	346772	193283	1200	..	6	..	6	..	2226	..	..
„ China ...	2685234	2010779	...	4853	23	..	23	100	5745	6200	112
„ Singapore ...	126572	86829	...	...	1	...	1	5060	2140	...	..
„ Mauritius .	48869	29376	..	...	230	..	230	..	..	..	..
„ Malta ..	213781	214508	...	...	...	...	..	...	..	...	..
Total export from 1st Jan to 1st Sept 1902.	101517348	97388167	1158951	617975	8595	14	8600	35378	418144	1351863	1013030

COUNTRIES	Coconut Oil. 1902 cwt	Coconut Oil. 1901 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac. cwts.	Coconuts. No.	Plumbago. 1902 cwts	Plumbago. 1901 cwts.
To U K. ..	149400	143091	9708	5576928	21	7564018	89307	117195
„ Austria ..	9362	2685	5000	120550	...	5510	..	..
„ Belgium ..	1794	3291	15904	147795	67943	146160	7543	12701
„ France ..	238	..	67306	14000	...	56020	1246	286
„ Germany ..	5738	2413	85753	1322600	68868	658035	45580	31025
„ Holland ...	..	..	476	213720	..	..	203	...
„ Italy ..	1519	1487	...	...	10	11285	7	...
„ Russia ..	60	..	28036	..	..	...	1546	3713
„ Spain ..	..	..	...	10250	..	...	..	...
„ Sweden ..	617	199	...	20350	..	5040	206	...
„ Turkey ..	...	...	..	...	...	..	..	...
„ India ..	46546	70915	5	...	...	20000	1715	230
„ Australasia ..	..	94	...	462581	21	..	216	132
„ America ...	59423	9010	...	1021930	...	...	171252	178041
„ Africa ..	60	76	..	17660	1	762381	..	...
„ China ...	339	707	..	1918	..	—	797	..
„ Singapore ...	71	...	...	...	...	...	...	...
„ Mauritius .	...	..	...	..	..	..	..	..
„ Malta ..	..	..	..	...	..	..	...	..
Total export from 1st Jan to 1st Sept 1902.	275166	233968	215183	8930362	136864	9222439	319618	273323

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Price Current, London, August 13th, 1902.)

	QUALITY.	QUOTATIONS
ALOES, Socotrine cwt.	Fair to fine dry ..	70s a 80s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
ARROWROOT (Natal) lb.	Fair to fine ..	7d a 8d
BEES' WAX, cwt.		
Zanzibar & Bombay White ,,	Good to fine	£6 a £7 10s
Yellow ,,	Fair ,,	£6 a £7 5s
Madagascar ,,	Dark to good palish	£6 12s 6d a £6 17s 6
CAMPHOR, Formosa ,,	Crude and semi-refined	160s a 175s
Japan ,,	Fair average quality ..	160s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	1s 9d a 2s
	Middling, stalky & lean	1s a 1s 7d
Ceylon. Mysore ,,	Fair to fine plump ..	1s a 3s
	Seeds .	1s 6d a 1s 7d
,, Tellicherry ,,	Good to fine ..	1s 6d a 2s
	Brownish ..	1s 3d a 1s 6d
,, Long ,,	Shelly to good ..	9d a 2s 9d
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 3d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	2⅛d a 2⅜d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	35s 6d a 40s
CINCHONA BARK.– lb.	Ledgeriana Orig. Stem	6d a 9d
Ceylon	Crown, Renewed	5d a 7d
	Org. Stem	3½d a 7d
	Red Org. Stem	3⅜d a 4¼d
	Renewed	3d a 5¾d
	Root	3¾d a 4d
CINNAMON, Ceylon 1sts per lb.	Ordinary to fine quill	8½d a 1s 6d
2nds	,, ,,	8d a 1s 6d
3rds	,, ,,	7½d a 1s 4d
4ths	,, ,,	7d a 11d
Chips	,, ,,	2½d a 10d
CLOVES, Penang lb.	Dull to fine bright bold	5½d a 1s
Amboyna ..	Dull to fine	4½d a 6d
Zanzibar and Pemba	Good and fine bright	3 13-16d a 4¼d
	Common dull to fair	3⅝d a 3¾d
Stems ..	Fair	1d
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	92s 6d a 120s
	Middling to fine mid ..	80s a 100s
	Smalls	47s a 70s
Native	Good ordinary	40s a 55s
Liberian ,,	Small to bold	30s a 40s
COCOA, Ceylon ,,	Bold to fine bold	65s a 80s
	Medium and fair	58s a 64s
	Native	50s a 60s
COLOMBO ROOT ,,	Middling to good	8s a 13s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair ..	£13 10s a £18
FIBRE, Brush ,	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£20 a £24
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £30
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	15s a 25s
CUTCH ,, ,,	Fair to fine dry	23s a 35s
GINGER, Bengal, rough ,,	Fair	40s
Calicut, Cut A ,,	Good to fine bold	80s a 90s
B & C ,,	Small and medium	48s a 70s
Cochin Rough ,,	Common to fine bold	40s a 43s
	Small and D's	35s a 38s
Japan ,,	Unsplit	32s a 34s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	10s a 35s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £18
	Part yellow and mixed	£7 a £9
	Bean and Pea size ditto	70s a £9 2s 6d
	Amber and dk. red bold	£5 15s a £8
	Med. & bold glassy sorts	90s a £7 17s 6d
Madagascar ,,	Fair to good palish ...	£4 a £8
	,, ,, red ...	£4 5s a £7 10s
ARABIC E. I. & Aden ,,	Ordinary to good pale	25s a 40s
Turkey sorts ,,		30s a 37s 6d
Ghatti ,,	Pickings to fine pale ...	10s a 25s
Kurrachee ,,	Good and fine pale ...	27s 6d a 30s
	Reddish to pale selected	10s a 25s
Madras ,,	Dark to fine pale ..	18s a 25s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	45s a 75s
	Ord. stony and blocky	9s a 30s
KINO ,,	Fine bright	4½d a 7d
MYRRH, picked ,,	Fair to fine pale	75s a 120s
Aden sorts ,,	Middling to good	50s a 70s
OLIBANUM, drop ,,	Good to fine white	48s a 50s
	Middling to fair	28s a 42s 6d
pickings ,,	Low to good pale	20s a 26s 6d
siftings ,,	Slightly foul to fine	18s a 23s
INDIARUBBER, Ceylon	Fine (grwn. fr. Para seed)	2s 0½d a 2s 7d
Assam	Good to fine	2s a 2s 3d
	Common to foul & mxd.	7d a 1s 6d
Rangoon	Fair to good clean ...	2s a 2s 4d
Borneo	Common to fine	6d a 2s 2d

	QUALITY.	QUOTATIONS.
INDIARUBBER (Contd.)		
Java, Sing. & Penang lb.	Foul to good clean ..	8d a 2s 1d
Mozambique ,,	Good to fine Ball ...	2s 6d a 2s 9d
	Ordinary to fair Ball ...	1s 10d a 2s 2d
	Low sandy Ball ..	6d a 1s 6d
	Sausage, fair to good ..	1s 10d a 2s 6½d
	Liver and Livery Ball ..	1s 9d a 2s 2d
Nyassaland	Fair to fine ball ..	2s 3d a 2s 6¾d
Madagascar	Fr to fine pinky & white	2s a 2s 3d
	Fair to good black ..	1s 7d a 1s 9d
	Niggers, low to fine ..	7d a 1s 9d
INDIGO, E.I.	Bengal--	
	Shipping mid to gd violet	3s 5d a 3s 9d
	Consuming mid. to gd.	2s 11d a 3s 3d
	Ordinary to mid.	2s 5d a 2s 10d
	Mid. to good Kurpah	1s 6d a 2s
	Low to ordinary	9d a 1s 3d
	Mid. to good Madra	1s 4d a 1s 10d
MACE, Bombay & Penang per lb.	Pale reddish to fine	2s a 3s
	Ordinary to fair	1s 4d a 1s 11d
	Pickings	1s 3d a 1s 4d
MYRABOLANS, Madras cwt	Dark to fine pale UG	5s a 6s
	Fair Coast	4s 6d a 5s
Bombay ,,	Jubblepore	4s 6d a 5s 6d
	Bhimlies	4s a 6s
	Rhajpore, &c.	3s 6d a 5s 6d
Bengal ,,	Calcutta	3s 6d a 5s
NUTMEGS— lb.	64's to 57's	2s 6d
Bombay & Penang ,,	110's to 65's	1s 1d a 2s 5½d
	160's to 115's	6d a 1s
NUTS, ARECA cwt.	Ordinary to fair fresh	14s a 18s
NUX VOMICA, Bombay per cwt.	Ordinary to middling	5s 6d a 6s
Madras	Fair to good bold fresh	7s a 10s
	Small ordinary and fair	5s a 6s 9d
OIL OF ANISEED ,,	Fair merchantable	4s 2d
CASSIA ,,	According to analysis	1s 10d a 2s 3d
LEMONGRASS ,,	Good flavour & colour	5d
NUTMEG ,,	Dingy to white	1½d a 2½d
CINNAMON ,,	Ordinary to fair sweet	3¼d a 1s 2d
CITRONELLE ,,	Bright & good flavour	9½d a 10d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody...	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ...	10s a 14s
	,, wiry Mozambique	10s a 11s
PEPPER– (Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ...	5⅜ a 5⅝d
Singapore ...	Fair	5¾d
Acheen & W. C. Penang	Dull to fine	4¾d a 5¼d
PLUMBAGO, lump cwt.	Fair to fine bright bold	30s a 35s
	Middling to good small	20s a 28s
chips	Dull to fine bright ..	9s a 15s
dust	Ordinary to fine bright	3s 6d a 7s 6d
SAFFLOWER	Good to fine pinky .	65s a 75s
	Inferior to fair .	40s a 60s
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£15 a £30
Chips ,,	... ...	£5 a £8
Madras, Logs ,,	Fair to good flavour ..	£15 a £30
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Ceylon ,,	Fair to good ..	£5 a £5 10s
Manila ,,	Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth...	£7
SEEDLAC cwt.	Ord. dusty to gd. soluble	115s a 120s
SENNA, Tinnevelly lb	Good to fine bold green	5d a 8d
	Fair greenish	3½d a 4d
	Common dark and small	½d a 3d
SHELLS, M. o'PEARL— Bombay cwt.	Bold and A's	48s a 120s
	D's and B's	
	Small ...	
Mergui ,,	Small to bold ..	£7 15s a £9 15s
Mussel ,,	Small to bold ...	17s a 55s
TAMARINDS, Calcutta... per cwt.	Mid. to fine bl'k not stony	8s a 10s
Madras	Stony and inferior ..	4s 6d a 6s
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	17s a 22s
TURMERIC, Bengal cwt.	Fair ...	14s a 16s
Madras ,,	Finger fair to fine bold bright	16s a 14s
Do. ,,	Bulbs ..	16s a 18s
Cochin ,,	Finger ..	10s a 18s
	Bulbs ..	9s a 9 6d
VANILLOES— lb.		
Mauritius .. 1sts	Gd. crysallized 3½ a 9 in	6s 6d a 22s 6d
Bourbon ... 2nds	Foxy & reddish 3½ a 8 ,,	5s a 15s
Seychelles 3rds	Lean and inferior ...	3s a 7s 9d
VERMILION lb.	Fine, pure, bright ...	3s 1d a 3s 2d
WAX, Japan, squares cwt	Good white hard ...	50s a 55s

THE
AGRICULTURAL MAGAZINE,
COLOMBO.
Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for September :—

Vol. XIV.] SEPTEMBER, 1902. [No. 3.

KURAKKAN.

SOME months ago we read some remarks of a Government Agent to the effect that Kurakkan is a palatable and nutritious food when properly prepared as a porridge, though only fit to be utilised for gun wads if turned out in the shape of the indigestible cakes so much affected by the village housewives of the North-Central Province.

We make this reference to show that even in Ceylon there are among the more enlightened population those who see some good in this much-maligned article of diet.

In our last issue we quoted under the head of "Three Chena Crops" the remarks of an African authority on the subject of native diet. The author of these remarks proposes submitting samples of Kurakkan (with other grains) to the authorities at the Imperial Institute, with a view to settling certain points relating the possibilities of Kurakkan, such as whether by careful and continuous selection, the hard husk of the grain can be reduced (as has been done with wheat and maize) to a minimum, and whether the grain could be harvested and cleaned, husked and milled on a commercial scale.

To give another instance of the good opinions that are gathering round this "pariah" among cultivated grains, we may mention that the Agricultural Explorer, the United States Government, on the occasion of his last visit to Ceylon, procured through us a quantity of the two cultivated varieties of Kurakkan seed for experimental purposes, with a view to testing its suitability for the warm arid regions of America, together with other drought-resisting plants (from the region of the Persian Gulf and India) which he was giving his attention at the time.

Kurakkan (well known as "ragi" in India) is scintifically known as *Eleusine coracana*, and is a cultivated variety of *E. indica*, a common weed. In the Madras Presidency the crop occupies no less than 1,551,000 acres, and in Bombay 802,000 acres. These are the returns for these Presidencies for 1887-8, but the plant is largely cultivated in other parts of India as well. In Mysore *ragi* constitutes the diet of four-fifths of the people.

Professor Church's analysis of the grain is as follows:—

	Husked.	Unhusked.
Water	... 13·2	12·5
Albuminoids	... 7·5	5·9
Starch	... 73·2	74·6
Oil	... 1·5	0·8
Fibre	... 2·5	3·6
Ash	... 2·3	2·6

The nutrient ratio is given as 1 : 13, and the nutrient value 84. Phosphoric acid exists in the whole grain to the extent of ·4 per cent. As a food Kurakkan is looked upon as indigestible, but it is the defective cleaning and preparation of the grain that causes indigestion and other stomach disorders. From a dietetic point of view it is a suitable food for the working man.

OCCASIONAL NOTES.

Mr. J. B. Carruthers, the Government Cryptogamist, is reported to be working at the "betel disease" with a view to discovering a remedy. The "disease" is due to a fungus and causes much loss to cultivators of this remunerative product. The application of lime to the soil has been known to check the attack, and Bordeaux solution is about to be tried in some of the infected School Gardens.

In an article on Tapeworm in the Dog appearing in the June number of the *Agricultural Journal of Victoria*, the following recommendations are made under the head of treatment:—"To expel tapeworms from dogs no remedy succeeds as

well as arecanut. The dog should be kept off food for about 12 hours, and then from 15 to 60 grains of powdered arecanut should be given in a little milk. A dose of 30 grains will suffice for a dog weighing 25 lbs., and 60 grains may be given to a very large dog, and 15 grains to a little one. About a couple of hours after the administration of the arecanut a dose of castor-oil should be given and the dejecta watched for the segments or joints, which may be seen to be crawling about, and these should be burnt before they get a chance to burst and scatter the eggs which they contain.

We have to acknowledge with thanks the following publications:—

Journal of Agriculture of Victoria.
Agricultural Gazette of New South Wales.
Queensland Agricultural Journal.
Journal of the Department of Agriculture, W. Australia.
Station, Farm and Dairy, Sydney.
The Indian Agriculturist.
The Indian Agricultural Ledger Series.
The Agricultural Journal of Cape Colony.
The Capricornian, Rockhampton.
The Sunday Times, Perth.
The Journal of the Imperial Department of Agriculture, West Indies.
The Veterinary Journal.
The Proceedings of the Royal Agricultural Society, England.
The Proceedings of the Highland and Agricultural Society, Scotland.

Nearly all these come as exchanges for our own Magazine, and they constitute an excellent nucleus for an Agricultural Reading Room.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF AUGUST, 1902.

1	Friday ...	Nil	17	Sunday ...	·50
2	Saturday ...	Nil	18	Monday ..	·33
3	Sunday ...	Nil	19	Tuesday ...	·11
4	Monday ...	Nil	20	Wednesday	1·10
5	Tuesday ...	Nil	21	Thursday ...	·35
6	Wednesday ...	Nil	22	Friday ...	·23
7	Thursday ...	Nil	23	Saturday ...	·12
8	Friday ...	Nil	24	Sunday ...	Nil
9	Saturday ...	Nil	25	Monday ...	Nil
10	Sunday ...	Nil	26	Tuesday ...	Nil
11	Monday ...	Nil	27	Wednesday	·70
12	Tuesday ...	Nil	28	Thursday ...	Nil
13	Wednesday ...	·10	29	Friday ..	Nil
14	Thursday ...	Nil	30	Saturday ...	Nil
15	Friday ...	·08	31	Sunday ...	Nil
16	Saturday ...	·08	1	Monday ...	·14
				Total ...	3·84
				Mean ...	·12

Greatest amount of rainfall registered in 24 hours on the 20th August, 1902, 1·10 inches.

Recorded by Alex. Perera.

A NEW EDIBLE TUBER.

The Agricultural Gazette of New South Wales for July contains an article (from which we cull the following information) on the New Edible Tuber, *Coleus (Plectranthus) coppini*, said to be cultivated and used in the French tropical colonies. From past experiments it would appear that the plant will thrive in the southern districts of France, and that, going on the analysis of the tuber, it is desirable to encourage its cultivation as a vegetable.

Successive analyses gave the following results:—

Fatty matter ...	... 2·50	per cent.
Glucose ...	... 16·68	,,
Saccharine ...	... 1·67	,,
Not defined ...	... 4·35	,,
Gum and Pectic matter	... 16·05	,,
Albuminous subsances	... 5·78	,,
Starch ...	... 14·00	,,
Ash ...	... 4·26	,,
Cellulose, ligneous matter and loss ...	... 40·71	,,
	100·00	

The ashes are said to consist of sulphates, phosphates and carbonates; the weight of the potash 2·49, and of soda 1·34 per cent. "The tuber," says Mr. Heckel, the author of the article, "containing fatty substances, is rich in starch, glucose and saccharine. It certainly contains but little albuminous matter, but is, nevertheless, a perfect food."

The taste of the tubers, when cooked, are said to be agreeable and somewhat like salsify, while richer in alimentary equivalents. Fresh, the tubers contain 80 per cent water, but they dry and shivel up in a few days when they show about 75 per cent.

This esculent would be a close relative to our "innala," sometimes spoken of as "country potato" (*Coleus parviflorus* before *Plectranthrus tuberosus*) locally considered to be a very wholesome vegetable.

A MANUAL ON BEE-KEEPING.

Bee-keeping in the West Indies is the title of a useful little pamphlet issued by the Imperial Department of Agriculture for the West Indies. The author of the manual is Mr. W. K. Morrison who, writing in a popular style, gives the reader a deal of useful information on the subject. He recommends bee-keeping as particularly well suited to schoolmasters, and if only our village pedagogues will occupy their spare time in the manner suggested, we shall before long have springing up a rural industry—eminently suited to the tastes of the easygoing villager, and affording the cultivator's family (and himself between sowing and reaping) a remunerative means of livelihood.

Mr. Morrison settles the question of the variety of hive by saying "the Langstroth is an all round hive suited to any purpose."

As regards variety of bee the author tells us, "The Cyprian is likely to do well in the

West Indies, as also is the Syrian or Palestine bee which is closely related to the former. The latter can seldom be obtained in a pure state, and the choice of a race for the West Indies is practically limited to the Italian, which is also the one best suited to local conditions." And again, "A dash of Cyprian blood in the Italian makes an excellent strain of bees for work in a hot climate."

At present, however, it will be enough if the "mee-messa" (*Apis indica*), the only satisfactory honey bee of Ceylon and one capable of domestication, is taken in hand and kept in frame hives, and the hints given in the West Indian pamphlet followed as to procedure.

In previous numbers of the Magazine we have given a complete account of what has been done in the past in the way of bee-keeping, describing the different varieties of honey-makers and their characteristics.

An experiment in apiculture has been carried on at the School of Agriculture since 1900, with a view to "educating" the Ceylon honey bee; and the Director of the Museum and Government Entomologist have shown interest in the experiment.

We must not omit to mention that Mr. Charles Andreé, of Kurunegala, has kept bees for many years, and planned a special hive on the lines of the Langstroth hive, specially suited to the Ceylon bee.

BETEL CULTIVATION IN INDIA.

(*Continued.*)

In Bengal three varieties are cultivated, one of which (difficult to grow) is known as 'sweet betel,' and has a fine flavour and odour like camphor. There it would appear that the vines are grown on 'pandals,' but before being allowed to creep over them the creeping stem is pulled down repeatedly, and a portion is made to rest on the ground in a soil which is covered with a little earth, a few leaves being plucked each time. Pond-mud and other good mould is used for occasionally earthing-up.

In Orissa, we read, the plant reaches maturity in 12 or 15 months and yields leaves for 50 or 60 years. An acre is said to yield from £88 to £100 gross or a net profit of from £25 to £35.

In Ahmednagar betel begins to yield from the third year, and picking is carried on at intervals of 8 to 10 days. The vine is cut to the ground once a year, after which new shoots spring up and are trained on to the live supports—*Erythrina indica* (erabodu) or *Moringa-pteryosperma* (murunga).

In Kandesh the leaves are plucked with the aid of sharp-edged thimble-like plates which nip the leaves clean off without wrenching the plant. Then the leaves retail at 1 to 2 annas per 100.

In Poona where it is well-manured the vines last from 15 to 20 years. Every year the upper half of the vine is cut, while the lower half is coiled and buried under fresh red earth and manure.

In Nasih the acre yield is said to be worth Rs. 150 to Rs. 750 annually, but from Rs. 400 to Rs. 600 are often spent before the crop yields any return. Stunted shoots are said to give the best leaves, soft, smooth and full of flavour, while those on luxuriant shoots are coarse. Two kinds of vines are distinguished, one yielding quick returns, the other better and larger crops.

In Dharwar the vines are planted in the open on quick-growing trees, 2,000 to the acre, the crop last for from 4 to 7 years. Then the vines are dug up and the leaves of the supports are used as manure and the wood for fuel. After a catch crop of sugar cane for which the land is well prepared betel follows on.

In Kanara betel is allowed to run up mango trees.

In Thana the vines are started in pits $1\frac{1}{2}$ ft. apart, and when established are given 5 oz. of oil cake (generally mustard as castor is found unsuitable) and a second dose of $\frac{1}{2}$ lb. being given at a later stage.

In Kolaba the vines are manured with fish and yield a crop in the first year.

The ordinary fertilisers used in India are dried and powdered cowdung or dry soil from ponds.

POULTRY PICKINGS.

Considerable vitality has lately been exhibited in poultry-fanciers' circles. We have long known that there are amongst us a few poultry enhusiasts, and the names of Messrs. T. Sanmugam, Chapman Dias, and Dr. VanRoyen are well known among Ceylonese brid fanciers, who have for some time been devoting time and attention to the subject of the improvement of poultry. Now, however, the number of private individuals who are interested in this home industry is larger, and we know of one Government officer who is taking up the matter of improving the poultry of his province from his official standpoint. Under these circumstances it is not unreasonable to expect that some real benefit will accrue to the country.

The following is a resumé of the results of the Poultry Show held on the 13th August taken from the *Ceylon Observer*:—

The Brahmas exhibited were considered no quality at all and cocks and cockerels received no prize. Langshans also failed to come up to expectations. The four Leghorn imported hens exhibited were capital specimens and there was keen competition between Mrs. F. C. Loos (jr.) and Mrs. M. J. Cary, the former being awarded the prize. There was a fair lot of country-bred Leghorns. Mr. Geo. John, who was the chief competitor, carrying off the prize for hens and Mrs. Cary for cockerels. Dr. Thomas exhibited a very fine imported Minorca cock which carried away the prize from two others. Mrs. Loos and Mrs. Bowie divided honours for hens in this class. Mr. Seale got first prize for c. b. Minorca cocks with an animal which showed good quality, as also did the hens amongst which Mrs. Bowie's bird got the prize. The

cockerels and pullets in this class were very difficult to decide upon for prizes as they were a fine level lot. Amongst Plymouth Rocks the imported and country-bred hens were judged together owing to the paucity of entries in the former class and, of course, the two imported hens carried away first and second prizes. They were fine specimens of the breed, the country-breds also showing comparatively good quality. The cockerels and pullets exhibited included some fine imported birds which secured three prizes for Mrs. Bowie, Mrs. Haslop getting third prize amongst pullets. A showy Orpington cockerel exhibited by Miss Kendal Watson was considered a very fine country-bred bird and was awarded the prize in its class, while the same lady carried away the prize in the next class as well. There was a very fine class of Indian game fowls which were acknowledged to be of even better quality than those shown at the last show at "Temple Trees." The Maha Mudaliyar's prize for the best Indian cock was awarded to Dr. VanRooyen's exhibit which was considered to be one of the best bred birds hitherto shown. This bird was erroneously entered on the list as belonging to Mr. Jeffery. Mr. Serasinghe's exhibit won the special prize offered by Major Firminger for the best Malabar cock in the Show. Mr. Henderson won the Cup presented by Mr. A. Y. Daniel for the best Indian game hen with a fine specimen of its kind, Mr. Jeffery coming second. The pure-bred Indian game pullets and cross-bred cocks and cockerels were of a very poor quality and got no prizes. In class 39 there was a fine specimen of the Plymouth Rock in a sturdy cock, but no prize was awarded, as there was hardly any competition. There were two pairs of Bantams, but they were not in condition, although the spotted black and white pair were indeed a pretty set. The prize in this Class (41) was, therefore, awarded to two white silkies which were curiosities in their way. There was quite a number of curlies exhibited. No guinea fowls were exhibited, and the few ducks on view were of a very poor quality. This was amply compensated for by the exceedingly fine collection of geese, Mr. Jeffery getting the prize for a very shapely trio and Mr. A. Y. Daniel coming a close second with a pretty pair, one white and one dun. The pigeons shown were all in very good condition, including a pair of rare White Barbs which many considered should have got at least second prize instead of the Brown English. Mr. Daniel's pair of Maltese were a fine large pair, one white and one light brown

Miss Kendal Watson's fine black Orpington cock was awarded the Championship prize offered by the Lieut.-Governor, the bird being from eggs supplied by Mrs. Bowie, whose imported Plymouth Rock ran it close. Mrs. Bowie got the prize for the best hen in the Show with a fine Plymouth Rock.

Our local poultry fanciers are, however, not to be satisfied with occasional Shows, but have established a Society and are going to have a Journal, both which we sincerely trust will be well supported and together be a power for good. It is only by combined action of this kind that any real work can be established, and it is a pity that the various Committees appointed in connection with Cattle, Poultry and similar Shows cannot unite to form an Agricultural Society which is sadly wanted in the Island.

Eggs for hatching which have travelled, should always be placed on their large ends in bran or chaff, and allowed to rest for 24 or 30 hours before placing under a hen. When valuable hens are in question, use two hens and place half the eggs under each. Never overcrowd a broody hen with eggs; give her rather a less number than she can cover.—*Journal of Agriculture, South Australia.*

Where birds come from a distance the following rules should be strictly observed :—

(1.) Place in a warm, well-ventilated coop, and keep for, say a week till the brid has settled down and seems quite well.

(2.) Give water sparingly, and even then it should be boiled and allowed to get cold. A change of water is often provocative of disease.

(3.) For a few days feed on bread soaked in boiled milk. If milk is scarce make a sop of stale bread and boiling water; then squeeze out the surplus water and add a little hot boiled milk. Gradually feed ordinary food.—(*Ibid.*)

A USEFUL DISCOVERY.

According to the *Station, Farm and Dairy*, Dr. Anderson, of Minnesota, has made a discovery which promises to revolutionise the preparation of staple food stuffs. The starting point of the discovery was the peculiar action of Indian-corn under the influence of heat, resulting in the parched grain known commonly as pop-corn. Already he has succeeded in adding something like sixty different kinds of starchy foods, by popping not only Indian-corn and rice but also potatoes and other starchy food-stuffs. Having found that popping was due to the expansion of moisture inside the corn, he concluded that he had only to secure three factors—heat, pressure, and a sudden release of the pressure. The next step was to construct a steel cylinder to represent the envelope of the grain. Having placed a piece of raw potato in the cylinder, the receptacle was closed and submerged to an interior pressure of three or four atmospheres. Heat above 220° F. was applied for a time, and then the pressure was suddenly released, with the result that there gushed up from the cylinder a mass of snow white "popped" potato as light as pith. This product can be compressed for transport and restored by soaking to prepare it for consumption. The treated stuffs are found to embody many advantages lacking in the original products, being delicate, soluble, digestible, and nutritious. Flour and water treated in the same way popped into "full-fledged biscuits" as light as feathers and free from fermented leavening so objectionable to weak digestion.

This so-called discovery proves what observation and thought can do. Popped corn, rice and potatoes steamed in their jackets are all familiar enough, but so long no one has seriously observed the conditions under which these delicate and digestible products were produced and the possibility of acting upon other starchy food stuffs—free from an enclosing membrane or jacket under similar conditions.

A word as to the value of popped Indian-corn and other grains. Medical men have by experience found that such products are digestible and nutritious, and prescribed them as a suitable diet for children, just as they would prescribe extract of malt, possibly owing to the fact that the change resulting from "popping" were similar from a chemical point of view to malting. In a lecture on Native Food Stuffs of Africa by Mr. Open, administering the Agricultural Department, Rhodesia (we quoted from his lecture in our last issue), the peculiar sustaining power of popped Kaffir corn or sorghum is referred to and instances given of its value as a diet under trying circumstances. Mr. Open there says, "I am sure there is considerable chemical change in the parched and burst grain, and that analysis would easily show the reason of its nutritiousness." We have no doubt that with the develorements in the direction of preparing starchy foods similar to popping grain, the chemistry of the process will be soon made clear.

NATURE STUDY LESSONS.

FIRST COURSE IN THE STUDY OF PLANT LIFE.

(*Continued from August Number.*)

THE LEAF.

Leaves differ greatly in size, shape and other characters, but most leaves agree in having a more or less thin, flat green portion called the blade. This blade is in some plants connected to the stem by means of a stalk as in the croton; in others the leaf stalk is absent as in screw-pine (Wetakeyia). In addition to these parts some leaves bear at the point where they join the stem a pair of leafy structures which may be very small as in the shoe-flower (Sapatumal), or large and leathery as in the bread fruit which drops them as the leaves expand. These are called stipules, and their function is considered to be the protection of the leaf buds or young leaves before expansion. Notice in the plantain tree how the young leaves are for protection rolled up in the hollow stalks of older leaves. The protection of le f buds by scaley leaves is seen in the grape vine (Mudarapalam), and in the underground stem of ginger (inguru). Some leaves are thick and fleshy as bowstring hemp (Neyanda). An onion bulb consists of a mass of succulent leaves closely packed round a tiny central stem. Here we have an instance of leaves storing food for the future use of the plant, as the swollen stem of the potato and the thickened roots of radish do.

On the surface of leaves are certain markings due to the presence of tougher structures running through the leaves. These are called veins, but unlike the veins in our body, which are hollow structures for the conveyance of blood, the veins of a leaf are solid. The principal vein which generally intersects the leaf into two equal parts is called the midrib. When this midrib is elongated or developed as in the mango, we get leaves of the pinnate or feather type, with veins branching out from it. When the midrib is contracted or undeveloped we get leaves of the palmate or hand type, as in the papaw (pepol), in which the veins seem to spread out like the fingers of the hand. There is a large class of plants in which the veins branch to form a kind of net work, as in the orange (panidodan), and another large class of plants in which the veins run parallel to one another as in the plantain. In some plants—ferns (meemana)—there is a peculiar forked arrangement of the veins. These arrangements of the veins help us to classify plants.

Notice in *Glorioso superba* (Niyagala) how the midrib of the leaf is extended to form a hooked structure which enables the plant to support itself; this being another of the special arrangements for helping the plant to grow upwards.

The surface of a leaf may be hairy as in *Coleus aromaticus* (Kappra walliya), and sometimes these hairs are of a stinging nature owing to an irritating fluid they contain, as in *Laportea cremulata* (Ma-ussa). There are also smooth leaves as those of domba.*

We have leaves of almost every shape—compare the heart-shaped leaf of *Colocasia* (Gahala), the kidney-shaped leaf of *Hydrocotyle* (Gotukola), the needle-like leaf of the whip tree (Casagas) the round leaf of the lotus (Olu) and so on. But leaves vary also according to the extent and the manner in which they have been cut into. Compare the entire leaf of the jak with the irregularly cut leaf of the bread fruit or papaw. Note that a leaf which consists of one blade, no matter how much it has been cut into, is a simple leaf. But leaf which has been divided up into distinct parts (leaflets), each of which constitutes a secondary leaf (bearing the same relation to the midrib, as the leaf does to the branch) is a compound leaf. Take a rose leaf and see how it consists of distinct leaflets. Examine a tamarind (Siyambala) leaf and see what you can learn from it in this connection.

A very strange form assumed by the leaf is the pitcher-like structure in the pitcher plant (bandurawel), but of this and other insect-eating plants such as the *Drosera* (wata-essa) I shall have more to say in another lesson.

You will also learn something of "seed leaves" when I come to speak of seeds.

THE FLOWER

I have told you that everything borne by the stem is a leaf or a modification of a leaf. Now the parts of the flower, you may be surprised to hear, are also modifications of leaves.

* In this connection notice the prickles on the surface of the leaves of the wild brinjal (Katuwalbatu.)

A perfect flower, that is one which has all its parts, such as the shoe-flower, may be said to consist of four distinct kinds of leaves. The outermost and lowest of the flower leaves form the calyx, which consist of small green structures (the sepals) like little leaves. Sometimes, as in the shoe-flower, we find an extra growth outside the calyx; this is called the epi-calyx, which is not commonly found. The flower leaves next to the calyx are the petals, which together constitute the corolla, the coloured and showy part of the flower. The calyx and corolla together may be called the protective organs of the flower since they protect the more important and essential parts of the flower which are within them.

The third series of flower leaves found next to the petals are the stamens in which you will still be able—as in the case of the calyx and corolla—to trace the original outlines of leaves. The stamens consist of delicate stalks supporting a two-lobed structure corresponding to the blade of a leaf. Inside the two lobed structure or anther is a yellow powder—which is shed when the anther is ripe—called pollen. You will see later on that this yellow powder is of the greatest importance in the formation of seeds.

The last and innermost series of the flower structure is the pistil. It is not easy to recognise the leaf here, but with a little trouble you will be able to do so. The pistil consists of a more or less hollow structure below, containing what may be called seed buds or ovules which afterwards become seeds. Alone, it consists of a style or a delicate stalk holding up the stigma, or the part on which pollen is shed. The stigma is generally either sticky or hairy in order to catch the pollen grains.

There, you have a general idea of the flower, and what you should now do is to examine as many flowers as you come across, and see if you could pick out the different parts you have been told about.

Remember that all flowers are not perfect. There are flowers that have only one of the protective organs, as you will see if you examine the tube roses in your garden. Some flowers have stamens and no pistil, as you will find in some of the flowers borne by your bitter gourd (Karavila) or Luffa (Vetakolu) creepers. Again some flowers have only the pistil without stamens, as in the large-flowered papaw. As minor points note that the stalks of the stamens may be missing as in temple-flowers (araliya), or the style may be wanting as in the papaw flower referred to above.

I must tell you of another leaf-like structure which is sometimes found on the stalk that bears the flowers. This is the bract, which is sometimes green, but more often brightly coloured or white. When large and enclosing a collection of flowers it is spoken of as a spathe. Carefully examine the coloured bracts of *Poinsettia* and Bougainvillea, for which there are no vernacular names; but they are common enough in gardens. The spathes of the coconut and arecanut palms are familiar enough, while some of you may have seen the white spathe of the garden caladium and the large showy spathe of the arum lily which grows upcountry.

THE FRUIT.

In speaking about the various parts of the flower I made mention of the ovary. True fruits are formed by the developement of the ovary, and when mature they contain one or more seeds which are nothing more than the ovules that have undergone certain important changes to be referred to later on.

You can watch the growth of the ovary into the fruit in your own garden in the bandakka or brinjal plant, and note the changes that take place.

Observe that some fruits are more or less dry and others are succulent. When the bean is mature it is dry, but a ripe orange or mango is quite succulent.

Some fruits are of a very simple structure. In the bean, for instance, you can distinctly trace the leaf structure. The pod may be said to consist of a leaf with its margins united, so forming a hollow body in which are contained the seeds. In the mango we can distinguish three layers in the structure which contains the seed: (1) the skin, (2) the pulp, and (3) the hard portion wrongly called the seed. The true seed of the mango is what is contained inside this so-called seed. The orange is not so simple in structure; it consists of a number of chambers, each of which has a few seeds imbedded in the succulent matter that is the portion that is eaten. The pineapple is still more complex in structure; it is called a compound fruit because it results not from one but many flowers. You should notice the pineapple when it is in flower and see how a large number of flowers take part in the formation of the fruit. But the pineapple is a very strange fruit, for the stalk which bears the flowers and parts of the flowers beside the ovary, also help in the formation of the fruit, and what is most peculiar is that there is a crown of leaves borne on the flower-stalk where it comes out at the top. The jak and the breadfruit are also compound fruits of somewhat similar structure to the pineapple.

The coconut resembles the mango in structure though not in shape, size, &c. Instead of a succulent outer covering we have a mass of fibre, but like the mango we have an inner shell. The edible portion of the coconut is therefore the seed. Paddy is a very simple fruit with a dry scaley covering, and rice is the seed.

You should notice that some fruits spring from below the flowers, while others spring from above it. In the guava the fruit is formed below, in the orange above the flower. Thus we speak of inferior and superior fruits.

Some fruits when quite mature split open, so that the seeds may fall, this is seen in beans. Others, like the mango, do not split. Most dry fruits split open while succulent fruits do not, but in the nutmeg you have a more or less succulent fruit which splits open.

There is still more for you to learn about fruits later on.

THE SEED.

You have some idea now of what is a seed. You know that it is formed from the ovules found within the ovary, but you will naturally

ask what makes the difference between an ovule and a seed? The chief difference is that the seed contains a minute plant called the embryo, and the ovule does not. This minute plant is formed in the ovule as the result of a process known as fertilisation, that is the influence of the pollen of the stamens upon the ovary of the flower and the ovules within it, resulting in the ovary and its ovules being transformed into fruit and seeds.

A seed may be said to consist of the following part:—(1) a seed coat, inside which are contained (2) the embryo or minute plant with a very minute stem and root and one or two seed leaves called cotyledons, with (3) a store of nutriment for the developement of the young plant in the earliest stages of growth and until it can supply food for itself. A seed may be compared to an egg, which also has a shell, a little embryo, which develops into a chicken, and a store of nutriment consisting of the red and white parts of the egg.

When the seed is put into the ground, under favourable conditions, it develops a young plant, just as an egg by the process of "hatching" produces a chicken, both having developed from an embryo nourished by the store of nutriment supplied to them. Some seeds are large as in the coconut, others are small as in paddy or mustard. Seeds vary much in colour and are sometimes mottled as in the castor oil. Seeds are smooth as in bandakka or hairy as in cotton. But all these differences you can observe for yourselves, and it would be very interesting to make a collection of seeds and note how they differ. The store of nutriment provided for the nourishment of the embryo is what gives value to all cereals as food, (just as it gives value to the egg as an article of diet) whether it be wheat, oat, barley, paddy, Indian-corn, beans or other kind of seeds. This nourishing portion is what has been provided for the development of the young plant, but which man appropriates for his own use.

TANNING MATERIALS.

Ceylon, like India, is rich in tan-producing trees, and Mr. D. Hooper's list of Raw Stuffs containing tannin with notes on their composition, &c., (*Agricultural Ledger*, No. 1 of 1902) deals with many trees common to both countries. The notes contain valuable information, and we therefore reproduce those of special interest from a local point of view. Allowance has, of course, to be made for different localities, for it is well-known that the proportion of tannin varies considerably in samples obtained from different places. Still the information given is a fair indication of the utility of local tan-producing trees.

In the following table the highest percentages obtained in examination by analysis of tanning materials is given :—

Terminalia chebula	... ...	Wood	28·6
Rhizophera mucronata...	...	"	26·9
Ceriops Candolleana ..	...	"	26·2
Cassia auriculata ...	...	"	23·0
Ceriops Roxburghiana...	...	"	19·2
Acacia dealbata ...	...	Wood	17·8
,, arabica ...	...	,,	16·7
,, leucophlea ...	...	,,	16·2
Brugnicra gymnorhiza...	...	,,	16·2
Bridelia retusa ...	...	,,	15·9
Kandelia Rheedii ...	...	,,	12·2
Casuarina equisetifolia	...	,,	11·1
Cassia fistula	...	,,	9·5
Acacia catechu ...	...	,,	6·8
Pterocarpus marsupium	...	Bark	5·4

Terminalia chebula (Sin. Aralu).—The fruits of this tree, well-known as chebulic myrobalans, are a valuable tanning agent. They are collected largely and exported to Europe. The dried fruits are extremely rich in gallotanaic acid and require no preparation except powdering or crushing in a mill. Some recent (1900) analyses by Dr. Leather of samples from different parts of India indicate that the tannin present varies from 31 to 43·74 per cent.

The fruits should be collected before maturity, otherwise there is apt to be variation in their strength. The oblong pointed solid fruits are much superior to the round and inflated ones. The astrigent principle lies in the outer pulp of the fruit, the stone-like kernel containing hardly any. (This is a fact that does not appear to be recognised locally.) The fruits are not liable to deterioration, so that it is more economical to export them in their natural condition. The extract (varying from 57·87 to 59·47) made in open pans tends to absorb moisture and to ferment when exposed to the air. It would therefore not be satisfactory to prepare a tannin extract from myrobalans, unless made with skilled appliances. (The preparation of such extracts will be described later.) A factory with vacuum pans has lately been established in India.

The bark, too, provides a valuable tan. In young trees the proportion of tan is about 33·0, not much inferior than in average samples of myrobalans.

The true galls found on the leaves and twigs are used in the preparation of ink.

Terminalia belerica (Sin. Bulu).—The fruit is a commercial article under the name of Beleric myrobalans, but it is inferior to the chebulic variety. Examination of different samples showed that the percentage of tannin varied from 5 to 17·4. The nuts are used in the adulteration of ground chebulic myrobalans.

Terminalia catappa (Sin. Kotamba).—The bark of leaves of the country almond give a black dye with salts of iron. Wardle in 1887 separated 9 per cent of tannin from Madras bark. (We find no reference made to the highly astringent character of the "husk" round the fruits.)

Terminalia Arjuna or glabra (Sin. Kumbuk).—The bark is astringent and is occasionally used for dyeing and tanning. Specimens examined yielded from 8·6 to 16 per cent tannin, giving a blue-black colour with ferric salts. The tannin in the fruits would seem to be very variable, ranging from 1·38 to 9·6 per cent,

Terminalia tomentosa.—The percentage of tannin varied from 5·7 to 13·6; that in the fruit from 4 to 5·9 per cent. The extract is said to be

too dark necessitating decolouration before condensation in a vacuum.

Anogeissus latifolia (Sin. Dawu).—The leaves and bark of this tree are astringent, a specimen of Madras bark yielding 32·5 per cent, and of leaves 15·5 per cent of tannin. The sale of dried and powdered leaves has been suggested.

(*To be continued.*)

THE PACKING OF FRUITS AND SEEDS.

BY J. H. HART, F.L.S.,

Superintendent, Royal Botanic Gardens, Trimidad.

(*Concluded.*)

(2.) SEEDS.

Some people are under the impression that the Botanic stations maintain seed shops, where any kind of tropical seed can be purchased in the same way as from seedsmen in temperate climates. It is not so. There are very few tropical seeds indeed, which can be safely kept for more than a month, a great many which cannot be kept more than a week, and not a few whose vitality is destroyed in one or two days if not properly cared for. Thus, a seed shop under European conditions for tropical seed is impossible.

Tropical seeds possess for the most part a very fugitive vitality, and are easily destroyed by an excess of either drought or moisture; but more quickly by the former. Even if left exposed to air, the humidity of which is generally high, they suffer largely, but if in a position where the alternations of dryness and humidity can affect them, they are destroyed in a very short time.

Proper methods have therefore to be devised to keep them in a suitable state until they reach their destination.

Such seeds as mango, cashew, nicker beans, some palms &c., can stand a large amount of hardship and will keep for a long time, and may be packed in bags or boxes for transit. It is quite a different matter, however, with seeds of *Artocarpus, Brosimum, Amherstia, Castilloa, Hevea, Cynometra*, &c., &c. Such seeds must be preserved in a suitable medium to keep them in good condition and preserve them for any length of time either in hand or on a journey. The best medium found so far, is the fine dust or short fibre from the interior of the coconut, commonly called coconut refuse. This material is the lightest that can be employed and answers well for almost any kind of seeds. It is especially suitable for packing in tins for transmission by post.

Another material which has been successfully used is weathered charcoal dust. New or unweathered charcoal dust is just as bad for packing seed as weathered dust is suitable, on account of its caustic character and the amount of moisture it will absorb from seeds packed in it. A danger with both materials is, that spores of certain fungi get into them and destroy the seeds they cover.

Packing for delicate seeds should not be too dry or too wet, but a happy medium between the two, just sufficient to prevent the seed losing moisture and insufficient to start it rapidly into growth. On the whole it is better that seeds should germinate on the way than be kept too dry, provided the process of growth does not reach beyond a certain stage.

Experience teaches that greater success is met with if seeds are started on their journey as soon after harvesting as possible, and not kept a day longer than is necessary. If only required for home use, they are best sown as soon as possible after being gathered.

There is another danger to which even the hardiest of our seeds are subject, and that is, the attacks made upon them by ants, weevils, and other small insects. Seeds which have suffered in this way are often to all appearance perfectly sound, but a close examination will generally show that the germ or growing part has been entirely destroyed. The seed is therefore useless.

Persons living in temperate climates, with no experience of the tropics, can hardly believe that seeds cannot be dealt with in the tropics as in temperate climates, viz., gathered, cleaned and placed in a "dry drawer" until required. Proof that imported seeds will not keep is to be found in the universal complaints of the bad quality of the seeds which are on sale. Many trials of freshly imported seeds have been made at Trinidad. As a rule, they have been found to be good on arrival, and to lose vitality exactly in proportion to the time allowed to elapse since they were imported.

Peas, which on first arrival showed a germination of 98 per cent, kept for one month in a dry drawer will have their vitality reduced to 40 per cent, and in three months' time not 10 per cent will germinate. Other kinds of seeds are affected in a similar way. If the period of test, however, happens to be in the dry season, vitality will be found to be more persistent.

These facts were recognised many years ago and have been met, by ordering periodical supplies at frequent intervals. Seeds can be kept for a greater length of time if they are imported in packages which have been sealed in dry air in the temparate zone and only unsealed as required. The best packages for seeds are small tins opening readily with a thumb piece, like Huntley and Palmer's biscuit tins, or the tins used for packing Capstan tobacco.

Continental seedsmen adopt new methods quicker than English traders. The latter do not appear to exert themselves to keep the West Indian trade.

The transport of seeds should always be made by the quickest route and by parcel post, where possible. Consequently they should be put up in light and handy packings.

SWEET POTATOES.

The West Indian Department of Agriculture are giving some attention to the growing and preserving of Sweet Potatoes. We feel sure that a good deal can be done to develope and

encourage the cultivation of this useful tuber in Ceylon. Most people associate the sweet potato with the Southern Province, where it is extensively and successfully grown; but few are aware that the tuber reaches the height of perfection in the Hanguranketa district. On a recent visit to this part of the country—eminently suited for vegetable and fruit culture—we had an opportunity of seeing for ourselves how the "batala" grows there. Two vines dug up at our request but quite at random, gave two potatoes which together weighed 10 lbs., or approximately 5 lbs. each, but we were informed on reliable authority that 8 lbs. as the weight of one yam was by no means uncommon. What is a noteworthy fact is that these boulder-like masses are on cooking as soft and mealy as could be wished, and practically contain none of the fibrous matter that so often spoils the flavoury tubers of the South. On the spot the price during the season is only one cent a pound, so that here is an opportunity for any one with an eye to business working on the lines adopted in Antigua for preserving the sweet potato in some form for future use. Mr. Spooner of that town is reported to have made many tons of meal, preparing it by slicing the potatoes in a chaff-cutter and drying them in the sun (as is done in Japan) on wire-netting —the drying being completed in about 8 hours. One ton of potatoes of this method yielded 910 lbs. meal at the cost of about £4 10*s.* per ton of meal produced. Dr. Voelcker, who analysed the product, found it had the following composition:—

Moisture ..	11·99 per cent.
Nitrogenous matter	5·12 ,,
Oil	1·19 ,,
Sugar	9·90 ,,
Starch and Carbohydrates	67·01 ,,
Woody fibre ...	1·89 ,,
Mineral matter ...	2·90 ,,

As regards the keeping qualities of the meal, we read that it was stored in tins for twelve months, after which time it was found to be quite good. We understand that another use to which sweet potatoes are put is for making spirit, which is shipped to Portugal for fortyfying wines. As regards meal, we fancy that the cost of production would be much less in Ceylon if the poorer Kandyan families can take up the preparation which, so far as we know, is not known among them, though Cassava and other meals are commonly prepared.

A good deal has been written about a banana meal industry for Ceylon, but though a sample, prepared by Mr. Chas. Stouter of Anuradhapura, gained a Gold Medal award at the Paris Exhibition of 1900, we understand that the price offered for the meal by probable dealers to whom samples were submitted both in Paris and London, was by no means encouraging. An analyses of Mr. Stouter's Plantain Meal has been given by us in a previous issue. The interest in the question of commercially manufacturing this product has evidently not altogether abated, as we learn that an enterprising gentleman is giving it his serious thought. To him we would commend for his consideration the cognate qestion of profitably manufacturing Sweet Potato Meal, than which we cannot think of a more suitable diet for children. An excellent way of preparing the potato for the table is first to boil, then slice and toast.

We hardly think there is room for improvement in the Hewaheta potatoes referred to above. Some time ago we imported tubers of what was described as one of the finest table varieties of America, but the product of their cultivation was by no means superior to the local article.

DIRECTIONS FOR HARVESTING THE TOBACCO CROP.

Tobacco plants are usually twenty-two weeks in maturing from the time of transplanting; and for four to six weeks after topping, when ready for cutting, the leaves become thick and brittle, and will crack when doubled between the finger and thumb. They also exhibit mottled yellow spots.

It is always wise to allow the plant to ripen thoroughly, as the quality is much improved by so doing and the weight much greater; the colour also is better and more uniform. The process of cutting is performed by splitting the stalk with a tobacco-knife down the centre to within 8 or 10 inches from the bottom, without cutting off the leaves.

The stalk is then severed close to the ground. The plant is better left with the butt up in the sun for an hour or two, according to the heat of the sun, when it becomes toughened or wilted, and can be handled without fear of breaking or bruising. Tobacco should never be cut directly after rain, or when it is wet from any cause. After heavy rain it is wise to allow at least one fine day to intervene before harvesting, to allow the nicotine to again accumulate. After tobacco has been well wilted, it can be placed in piles of five or ten plants, one directly above the other, until the cart is ready to take it to the scaffold or shed. In good fair weather the better plan is to hang the plants on the scaffold, first putting them on small sticks about four feet in length by opening the split stalk and hanging the plant across them. It is a mistake to put the plants too closely on the stick, the best guide as to distance being to allow the breadth of the hand between the butts at the top of the stick. The stick, containing eight or fourteen plants according to size, is then hung on the scaffold, allowing about ten inches of space to separate them. When the tobacco begins to colour a nice yellow or light brown, which usually occurs in this climate in seventeen or eighteen days, it should be removed to the shed. If the tobacco is to be cured by open fires, close your sheds up as soon as all the leaf begins to colour well, and keep your fires going in pits in the floor, keeping a low degree of heat, say 70 to 80 degrees, after which raise the heat slowly until at the end of two days you have reached 125 degrees, after which you can safely go to 125 degrees. The tobacco must be carefully watched until the midrib of the leaf is dry two-thirds of the way down, then the fires can be withdrawn and the shed will

cool. The tobacco will then absorb a certain amount of moistnre and become soft, and the colour will become regular. If wet weather should come after this process is finished keep small fires in the shed to maintain an even temperature. More tobacco is spoilt by too fast airiug than too slow, and care should be taken to see that the tobacco does not get wet or poleburn while the drying process is going on. If such should occur, open up the shed at once to allow free circulation of air, and when the sweating stops go on with the fires. The system generally followed by growers in Victoria is that for air curing is open sheds with the aid of little firing. The shed is covered rouud with hessiau, which is rolled up during fine weather, and the air allowed to get through the tobacco.

Directly wet weather ensues the hessian is dropped, the shed closed as close as possible, and small fires lighted in pits to keep out an excess of moisture.—*Victoria Agricultural Journal.*

GENERAL ITEMS.

In Germany the regulations of the Meat Inspection Act of 1900 are of the strictest, and prohibit the use of boracic acid and its salts, formaldehyde or formalin, salicylic acid and its compounds and other less known substances; but in England the Committee of the Local Government Board have allowed the use of boracic acid and its compounds iu fresh and cured meat, butter, &c., (equivalent to 5 per cent boracic acid) and one grain per lb. or pint of salicylic acid except for milk, cream, and butter and infants' food. The presence of salicylic acid where used must be declared and the use of formalin is condemned.

A Mr. Swinle is reported (by the *Chicago American*) to have produced (aud to be able to reproduce always) water melons up to 20 lbs. weight, which do not contaiu a single seed.

The Arseuite of Soda, the *Queensland Agricultural Journal* states, that the Principal of Hawkesbury Agricultural College has found a solution of one lb. of the chemical to eight quarts of cold water very effective, the spray killing every living plant on the ground, on which nothing was able to grow for quite a month. So that for keeping garden walks, tennis courts, &c. clear of weeds, nothing could be better.

The *Journal of the Jamaica Agricultural Society* refers to the "Lawtou Process" of fruit preserving as a decided success, and states that delicate fruit (such as bananas) could now be carried from the ends of the earth to London with safety.

Here are some useful hints for thrifty housewives:—

(1.) *Ink Stains.*—Ink stains are very easily removed if put immediately in milk and slightly rubbed for a few minutes. If allowed to dry, they are not so easily removed, but can be by a little more effort.

(2.) *Blood Stains.*—Blood stains can be removed from an article that you do not care to wash by applying a thick paste made of starch and cold water. Place in the sun, and rub off in a couple of hours. If the stain is not entirely removed, repeat the process, and soon it disappears.

(3.) *To remove Mildew.*—Soak and wash the spots in sour milk and you will have no trouble in removing the same.

(4.) *Fruit Stains.*—Hold the goods stained over a vessel in such a way that pouring boiling water on the opposite goods, and in a short time the stain will be seen to disappear.

(5.) *Iron Rust.*—Place a bright tin, pour over a kettle steamiug with boiling water, moisten the goods with water and hold the iron rust spots closely to the tin and rub them with oxalic acid. As soon as you see the rust disappear rinse in cold water to remove the acid, as it tends to rot the goods, but if the process is performed quickly there is no danger of this.—*Queensland Agricultural Journal.*

The following facts from the *Sunday Times* are calculated to make one pause and think a little about the complexity of that wonderful machine, the human body:—"Every time the heart beats a small tumblerful of blood is passed from one of the chambers of the heart towards the lungs to be purified; at the same time another tumblerful of purified blood leaves the heart to travel through the system. As the heart beats 72 times a minute, it thus deals with about 3 gallons of blood iu that brief space. The body contains roughly 70,000,000 pores which are always giving out moisture, though this may not appear as beads of perspiration. During hot weather or when laborious work is being done, the moisture given out varies between a piut and a quart a day. Every square inch of the body bears a pressure of 14 lbs., or a total of about 29,000 lbs. on the entire body. Every meal we eat traverses a jouruey during digestion and assimilation of about five times the height of the human body. This fact should be sufficient to persuade agaiust over-feeding aud over-taxing the digestive organs.